The Scientific Review,

AND

SCIENTIFIC AND LITERARY REVIEW,

A RECORD OF PROGRESS IN ARTS, INDUSTRY, AND MANUFACTURES,

INCORPORATING THE

Journal of the Inventors' Institute.

[REGISTERED FOR TRANSMISSION ABROAD.]

[ALL RIGHTS RESERVED.]

Vol. XV.—No. 12.] DECEMBER 7, 1880. [Price 6d.

SUBJECT MATTER INDEX OF APPLICATIONS FOR PATENTS.

October 20th to November 20th inclusive.

The following Index gives first the class, then the name of the Inventor. In this list (com.) means Invention communicated from abroad. Further information as to the progress of these Patents by Notice to Proceed, Sealing, and Specifying, can be obtained at the Office, 21, Cockspur Street, Charing-cross.

Acids.—J. Imray (com.)

Aerated Liquids, Mineral Waters, Aerating, &c.—L. Shapter, E. W. Allen.

Aerial Machines, Aerostation, Balloons, &c.—H. A. Bonneville (com.)

Air, Gas and Wind Engines, and Mills, Pneumatic Motive Power.—F. W. Crossley, G. D. Bishopp, J. C. Rhodes, W. Goodbrand and T. E. Holland, M. Benson (com.), T. D. Macfarlane, H. N. Bickerton, C. Cottaine, J. N. Blumerberg, H. L. Miller and W. Adkins.

Air, Gases, and Vapours (Pumping, Forcing, Exhausting, Compressing, &c.)—W. R. Lake (com.), C. Chapman.

Alkalies (Soda, Potash, Lithia, Ammonia.)—W. Black and T. Larkin, J. S. Stevenson.

Ambulances, &c.—W. R. Lake (com.)

Anchors (Marine). Lowering Anchors, Moorings.—J. Wright, S. Baxter.

Axles, Shafts, Bearings, Journals, Axle Boxes, Packing for Axles, Lubricating Axles, Pivots, &c.—H. Richards, C. F. Parsons, W. S. Laycock, J. B. Savage (com.)

Bags, Portmanteaus, Sacks, Holders, Satchels, Reticules, Knapsacks, Valises, &c.—J. Moore, H. Rankin, J. O. Oyex, E. Pfeiffer (com.)

Bands, Belts, Straps, Chains, and Ropes for Driving Machinery, Belt Shippers, &c.—J. Heap, W. R. Lake (com.)

Barometers, &c.—E. Edmunds (com.)

Baths, Bathing Appliances.—W. T. Sugg, J. Livermore.

Belts, Gongs, Ringing Bells, &c.—G. Skrivanoff.

Belts, Braces, Garter, Girths and Bands for Wear.—H. J. Haddan (com.), P. W. G. Nunn, J. W. Richards, G. W. von Nawrocki (com.), J. S. Comrie.

Beverages, Liqueurs.—E. W. Allen, T. F. Henley, J. M. Williams (com.)

Bleaching, Decolourising, &c.—G. M. Cruikshank, W. Birch.

Bobbins, Spools, Reels, Cop-tubes, &c.—W. Ambler.

Boilers, Coppers, Kiers, &c.—F. King and G. Green, R. Coles, W. Birch.

Books, Albums, Portfolios, Book Covers, Book Cases, Book Slides or Holders, Bookbinding, &c.—P. F. Rossiner, W. Snell and J. Fisher, J. McCann, J. W. Cochrane, W. Keenan, L. Furger, J. Davies.

Boots, Shoes, Leggings, Clogs, Cleaning Boots, Boot-jacks.—J. F. Fryer, J. Sharp and S. Austin, M. L. Muller, P. G. Acres and W. Freeman, W. H. Dorman. G. F. Claypole, C. Varlot.

Boring, Drilling, and Rifling, Gimlets, Augers, Drills, Reamers, Boring Bits, Ratchet and other Braces.—T. English and J. S. Parlour, A. T. Muir, W. W. Hulse, W. Thompson.

Bottles and Jars, Bottle-holders, Bottle-stoppers, Capsules and Corks, Bottling and Decanting Liquids, and Opening and Closing Bottles, &c.—J. Davies and P. Humphries, E. D. Day, H. J. West, G. Wheeler, L. Gros, W. A. Ross and F. Lockhart.

Boxes, Trunks, Portmanteaus, Letter-boxes, Workboxes, Dressing Cases, Trunks, Bins, Chests.—H. H. Lake (com.), W. and H. H. Dawes, P. F. Rossini, W. Snell and J. Fisher, H. H. Lake (com.), B. J. B. Mills (com.), P. Jensen (com.), W. R. Lake (com.)

Bread, Biscuits.—C. Harvey.

Breaks for Machinery, Stop Motions, &c.—J. Briggs, T. Coltman.

Breaks for Railways, Tram Cars, and Road Carriages.—S. B. and J. W. Perrett, S. Jarmain, T. Coltman, G. Gresham, W. P. Thompson (com.)

Brewing, Treating Malt, and Malt Liquors.—C. Morfit, G. Cave, W. R. Lake (com.), E. Walker, F. Wirth (com.)

Bricks, Tiles, and Building Blocks.—P. Balmer, E. J. Shackleton and J. Kemp.

Building, Plastering, Roofing, Flooring, Scaffolding, Walls, Ceilings, Floors, &c.—J. M. Tall.

Buttons, Studs, Sleeve Links, and other Dress Fasteners, Eyelets, Button Holes, Solitaires, &c.—W. West, M. L. Muller, F. H. F. Engel T. Fairley, G. W. von Nawrocki (com.), C. Varlot.

Candles, Tapers, Night-lights, &c.—W. H. Beck (com.)

Cans, Canisters, Tins, &c.—A. S. Wells, D. K. Wallwork, T. G. F. Dolby.

Carpets, Hearthrugs, Carpet Linings, and Druggets.—A. C. Herts.

Carriages, Cabs, Omnibuses, Waggons, Carts, Trucks, Perambulators, Barrows, Loading, Unloading, and Tipping Carts, &c.—W, Cole, W. R. Lake (com.), T. G. A. Parkyns.

Cartridges, Cases and Holders, Percussion Caps, &c.—H. H. Lake (com.), H. Skerrett.

Casks and Barrels, Cask-stands, Filling Casks, Vent-pegs, Tilting Casks and Barrels, &c.—F. Baxter, P. J. Catterall, and J. S. Crowley, W. L. Wise (com.).

Casting and Moulding Plastic Materials.—P. Bowden, J. Chase, W. S. Somers, F. Wirth (com.),

Cement, Plaister, Mortar, and Concrete.—W. S. Dawe, W. Forsyth, H. Faija, S. Mayall.

Centrifugal Machines.—C. D. Abel (com.).

Chains, Chain Cables, Shackles, Links, Swivels, &c.—T. Baxter, R. Wotherspun.

Charcoal, Coke, Carbon, Lamp-black, Plumbago, &c.—D. McEacbian, L. V. Semet, and E. Solvay.

Chemical Vessels, &c.—T. Morgan (com.), J. Mactear, J. Bowing.

Chenille, &c.—C. Crosier.

Cisterns, Water Tanks, Reservoirs, Vats, &c.—F. King, and G. Green.

Cleaning and Polishing.—J. Bowing, W. J. Clapp.

Clocks, Watches, and other Timekeepers, Watch Keys, &c.—R. H. Ridout, F. H. Velati, W. R. Lake (com.), Clutches, W. Mather (com.)

Coffee, Cocoa, and Tea; Coffee-pots, Teapots, Urns, &c.—F. T. Henley, W. H. Andrew.

Condensing Gases, Fumes, and Vapours, Condensing, &c.—W. E. Gedge (com.), C. Winken, J. Thompson, J. Griffith, J. H. Johnson (com.)

Cooking, and Apparatus used in Cooking, &c.—W. R. Lake (com.), F. Ryland, A. M. Clark (com.), A. C. Henderson (com.)

Copying, Tracing, Drawing, Writing, Ruling Paper, &c.—A. P. Hansen, E. Hill. L. B. Bertram, A Ford, C. D. Abel (com.)

Cruet, Liqueur, and similar Frames, Condiment Receptacles, Toast Racks, Egg Cups.—A. M. Clark (com.), J. S. Williams.

Cutting, Sawing, Planing, Morticing, Carving, &c.—S. Rolland, J. and G. Kershaw. A. W. L. Reddie, A. Muir, H. Olrick (com.), F, W. Mondriam, J. Holdgate, J. B. Savage (com.), J. Davies, R. A. Hill, and H. B. Barlow.

Cylinders and Rollers, Covering Rollers.—J. Windie, R. Carlyle.

Disinfecting, Deodorising, Fumigating, &c.—E. Warner, H. Seward, W. A. Barlow (com.)

Distilling and Rectifying, Bituminous Distillation, &c.—W. R. Lake (com.), J. S. Stevenson, W. A. Barlow (com.)

Docks, Basins, &c.—J. T. Parlour.

Doors, Gates, and Door Furniture.—A. and R. F. Heath, H. Skerritt.

Drains, Sewers, Gutters, Gulleys, Ditches, Sinks, Sewer and Drain-pipes, and Tiles.—H. Seward, R. H. Reeves, G. S. Waring, G. Robson and E. Herduran, D. Brown.

Dresses, &c.—E. Eavestaff.

Drinking Vessels, Tumblers, Cups, Goblets.—J. Dunbar and R. Harper.

Drying or Desiccating, Expelling Moistures, &c.—C. D. Abel (com.), E Walker, J. H. Johnson (com.), E. Donald.

Dyes, Dyeing, Bleaching, Cleansing, Staining, Printing in Colours, &c.—T. Holliday, T. J. and C. H. Pickles, H. Smithson, F. A. Gatty, W. D. Thornton, H. J. Haddan (com.), C. Lowe and J. Gill.

Electricity, Galvanism, and Magnetism, and their Application.—W. R. Lake (com.), G. Skrivanoff, P. Jensen (com.), H. H. Lake (com.), E. Edmonds (com.), C. P. Heinrich, H. E. Newton (com.), F. Harmant.

Electric Light, Electric Lighting Apparatus.—J. H. Johnson (com.), C. W. Sumers, J. E. H. Gordon, J. A. Berly and D. Hullett.

Envelopes (Postal).—A. M. Clark (com.)

Explosive Compounds, &c.—C. Pieper (com.), E. L. Beckwith and T. B. Lightfoot, C. D. Abel (com.)

Extracts and Infusions (Obtaining).—C. J. Sims.

Eyelets.—C. Morfit E. A. Pallister. C. Varlot.

Fabrics, Elastic Fabrics.—W. L. Wise (com.)

Felt, Felted Fabrics, Frilling, &c.—W. A. Barlow (com.), E. Dordet.

Fences, Fencing, Hurdles, Railings, Palings, &c.—W. Rowell, H. Sherrett.

Ferrules.—G. G. Lusher.

Fibres (Obtaining and Treating).—A. Greenwood, H. M. Gurwood.

Files and Clips, Paper Fasteners.—J. McCunn, J. N. Cockrane, W. Keenan, W. Dawine and W. F. Loty.

Filters; Filtering, Purifying, and Clarifying Liquids, Distilling Water, Softening Water.—C. Dickiuson and J. N. Robson, W. Hanson, C. Kesseler (com.)

Finishing and Dressing Woven Fabrics, Yarns, and Threads, &c.—J. Stead. G. H. Nussey and W. B. Leachman.

Fire-Arms, Guns, Ordnance, Gun Carriages, Targets, Rifle Practice.—J. F. Swinburn, M. Kaufmann, H. H. Lake (com.), G. Pace, A. J. Boult (com.) T. Nordenfelt (com.), T. Kiernan, W. R. Lake (com.), C. Kesseler (com.)

Fire-Places, Stoves and Ranges, Fenders and Fire-Irons, Fire-Guards, &c.—W. R. Lake (com.), C. A. Brodribb, C. M. Westmacott, E. R. Holland, J. H. Bowrlyey, A. Jennings, G. K. Hannay, H. H. Lake (com.), W. S. Melville, J. Jobson, T. J. Constantine, H. Thompson, J. Sawyer. J. Couper.

Flues and Chimneys, Chimney Pots and Cowls.—J. Amson, J. R. Day. A. Thomson and R. Anderson.

Food for Animals, &c.—C. P. Spongberg. Fountains, T. Kennedy.

Fuel (Artificial), Fire-lighters, &c.—J. R. Lever, E. Elford and A Carr.

FURNACES and Fire-boxes, Supplying Furnaces with Fuel.—S. G. Thomas and P. C. Gilchrist. J. Amson, J. B. Ball, W. Black and T. Larkin, W. Griffiths, J. N. Bourlay, J. Mactear, H. H. Lake (com.), F. G. Cheesbrough, W. R. Lake (com.), J. Jones, W. S. Williamson, J. Teale, T. J. Constantine M. and J. Crosthwaite, J, Procter, W. L. Wise (com.)

FURNITURE, Bedsteads, Tables, Cabinets, Chairs, Desks, Wardrobes, Upholstery, Cabinet-work, &c.—B. J. B. Mills (com.), P. M. Justice (com.), M. Hartmann, A. and J. Lloyd.

GAMES and Exercises Billiards and Bagatelle Markers and Indicators for Games, Gymnastic Apparatus.—H. J. Haddan (com.), W. P. Gregg, R. H. Bishop and H. F. Hailes, H. Y. Dickinson.

GARDEN IMPLEMENTS.—W. Clark.

GAS, Gasometers, Holders, and Retorts.—A. Ford, P. J. Wates, T. and J. Chandler, W. Hewitt, B. J. B. Mills (com.), J. Macdonald, L. V. Seuret and E. Solvay, C. F. Dieterich.

GAS and other Burners.—F. Rosenthal (com.)

GAUGES, Water-level Indicators, Indicating Depth, &c.—F. King and G. Green, R. and J. Jones.

GLASS (Making and Treating) and its Applications.—C. N. Blemberg (com.), S. A. Wittman (com.), J. Couper.

GLOVES, Gauntlets, Mittens.—J. F. Fryer, J. Livermore, W. West, M. L. Muller, T. H. F. Engel (com.)

GOVERNORS for Engines and Machinery.—E. P. Alexander (com.), C. W. Wardle, S. Daniels.

GRAIN and Seeds (Treating, &c.)—W. R. Lake (com.)., H. M. Clements, T. F. Hentey, E. R. Southby.

GREENHOUSES, Hothouses, Conservatories, Forcing Pits, and Frames.—R. Coles.

GRINDING, Crushing, and Disintegrating Corn, Grain and Seeds, and Dressing Flour.—J. Higginbottom, C. Herbert.

GRINDING, Crushing, Pulverising and Disintegrating Miscellaneous Substances.—C. Priper (com.), J. Chaee, D. Strattan (com.), F. J. and C. H. Pickles and S. Smithson, T. R. Jordan, E. J. Sharkleton and G.. J. Kemp, C. Herbert.

GRINDING and Polishing, Smoothing and Surfacing, Emery, Sand, and Glass Papers, Cloths, and other Substances.—W. Waine and C. D. Douglas, W. J. Clapp, R. R. Gubbins.

GRINDING and Sharpening.—S. Rolland, W. R. Lake (com.), G. Eddy.

HAMMERS, &c—W. R. Lake (com.)

HARBOURS, Piers, &c.—W. Rennie.

HATS, Coverings for the Head, &c.—F. Wirth (com.)

HEATING, Warming, and Evaporating, Obtaining and Regulating Heat, &c.—W. R. Lake (com.), G. G. Cave, W. L. Wise (com.), J. N. Leeds, R. Coles, J. H. Johnson (com.), J. M. Forbes (com.), W. Stanton,

HOISTS, Jacks, Lifts, Winches, Cranes, Capstans, Windlasses, Raising, Lowering and Moving Heavy Bodies, Raising from Mines.—J. T. Parlour, T. Archor, E, Hill, R. Brown, W. R. Lake (com.). W. H. Harfield, J. Wasere, W. Thomson.

HORSE Shoes, Shoeing Horses, Shoes for Animals, &c.—W. A. Gratti (com.), W. R. Lake (com.),

INKSTANDS, &c.—J. Bastand.

JARS, Jam Pots, &c.—L. Gros.

JEWELLERY, &c.—W. West. F. Velati.

KNITTING, Looped Fabrics, Tatting, Crocheting, &c.—N. Marshall, W. H. Beck. S. Thacher.

KNIVES, Forks, Table Cutlery, Knife Cleaners. —H. J. Haddan (com.)

LACE.—A. G. Duncan (com.) G. Bentley.

LAMPS, Lanterns, Chandeliers, Gasaliers, Lamp Furniture, Lighting and Extinguishing Lamps. —W. E. Errington, G. P. Ganster, P. Wirth (com,), H. H. Lake (com.), R. H. Ridons, J. S. Goldsmith, W. Thomas, C. W. Siemens, W. Green.

LAVATORIES, Washing Basins, &c.—J. N. Holland.

LEATHER, Treating Hides and Skins, Parchment, Currying, Tanning, Cutting, and Ornamenting Leather.—S. Haley, V. Lesage (com.), O. Wolff, E. P. Alexander (com.), J. M. F. Fletcher, G. F. Claypole.

LIFE-BUOYS, &c.—W. R. Lake (com.), W. Balch, F. Cornish, J. S. Comrie.

LOCKS, Latches, Bolts, Lock Furniture, Keys.—W. White, E. Pfeiffer, M. Volk, D. Waine, T. E. Julian.

MANURE; Treating Sewage.—J. H. Johnson (com.)

MATCHES, Fuzees, Pipe and Cigar Lights, &c. —P. Jensen (com.)

MATHEMATICAL, Surveying, and Astronomical Instruments.—W. Vaughan and A. Clark.

MATS.—P. McLellan and W. Jones.

MEASURES, Measuring, &c.—H. M. Clements, G. Firth, W. R. Lake (com.)

MEDICINES, &c.—R. Rousseaux, J. Dunbar and R. Harper, W. R. Lake (com.)

METAL Waste.—G. and J. W. Jones, R. J. Letcher.

METALS (Annealing, &c.).—W. Hewitt.

METALS (Casting, Moulding, &c.)—P. M. Parsons, W. McKechine, H. T. Grainger.

METALS; Cutting, &c.—J. and J. Kershaw, A. Muir, H. Olrick, J. B. Savage (com.), R. H. Hill and H. B. Barlow.

METALS (Plating and Coating, &c.) —W. Hewitt, N. Smith.

MUSICAL Instruments, Music, &c.—R. Holliday, J. Kew, A. Capra, J. B. Rusine, S. Detoma.

NAILS, Spikes, Bolts, Rivets, Screws, &c.—H. J. Haddan (com.), B. J. M. Mills (com.) W. R. Lake (com.), A. M. Clark (com.)

NOXIOUS Gases, (preventing) &c.—F. J. Bramwell, R. H. Reeves.

OILING or Lubricating, &c.—W. S. Laycock, W. P. Thompson (com.), A. C. Wells and R. Wallwork.

OILS, Fatty Matters, Grease.—W. Brierley, W. R. Delveer, C. T. Bastand, W. R. Lake (com.)

ORNAMENTING, &c.—A. Heaven, W. L. Wise (com.). M. Hartmann, J. Couper.

OXIDATION, &c.—W. Renney, W. R. Lake (com.)

PACKING, Storing, Baling, &c.—B. Talbot, T. Stead, A. M. Clark (com.) W. R. Lake (com),

PAINTS, Colours, Varnishes, &c.—E. Wright, J. Chapman and G. Bates.

PAPER, Paper Hangings, Pasteboard, and Papior Mache.—A. M. Clark (com.), W. L. Wise (com.), W. H. Richardson and H. Fleming, A. Ford, C. Kesseler (com.), E. Dorset, J. Davies.

PENS, Penholders, Pencils, Pencil Cases, &c.—A. P. Hanson, W. R. Lake (com.)

PIPES, Tubes, and Syphons: Joining Pipes.—W. E. Gedge (com.), W. R. Lake (com.), J. C. Johnson, W. L. Wise (com.), E. Ward and W. Bevis, W. Stainton, M. Smith.

PRESERVING and Preparing Articles of Food.—W. R. Lake (com.), T. Williams and J. Sangster, A. C. Herts. J. McWilliam.

PRESSES, Compressing, &c.—C. Dickenson and J. W. Robson, W. S. Somers.

PRINTING and Transferring: Type and other Surfaces for Printing, Composing, and Distributing Type.—F. Payne, A. M. Clark (com.), J. N. Woodhouse, A. Sauver, L. Bertram, J. Kerr and J. Haworth, C. T. Bastand, E. Edward, J. McLeod.

PROPELLING Machinery, Transmitting Power, and Motion, Converting Movements.—A. M. Clark (com.), W. Thompson.

PROPELLING Ships, Propellers, Paddle-wheels and Screws.—W. Stick, R. Hull, E. J. Brewer (com.)

PUMPS, Pumping and Forcing Liquids, Pumping and Raising Water and other Liquids, Pumps, Pistons, and Packing.—R. Brown, O. Chapman.

RAILWAYS, Carriages, Coupling, Uncoupling, and Altering Positions of Carriage and Engines.—R. Punshon, B. Macnee, F. Jackson and E. R. Austin, R. P. Williams, R. C. Rapier, C. W. Hartley, A. Fairlie, P. Burrell and H. Valpy.

RAILWAY, Permanent Way, Rail Joints, Chairs and Sleepers, Portable Railways, Atmospheric Railways, Switches, Points, Crossings, and Turn-tables.—R. C. Rapier, C. W. Hartley, C. J. A. Nicolet, A. Fairlie, R. J. Letcher, P. Burrell, and H. Valpy.

REAPING and Mowing. &c.—E. Smith, R. C. Ransome (com.), W. G. Manwaring.

REFLECTORS, &c.—J. S. Goldsmith.

REFRIGERATING and Freezing, Cooling Liquids, Making Ices.—W. R. Lake (com.), G. G. Cave.

REGISTERING, &c.—J. A. Muller, J. Hodges, E. Braubach, C. W. Wardle, H. Ferguson and H. R. Kempe.

ROADS, Paths, &c.—E. J. Chaston.

SCREWS, Screw Drivers, &c.—W. W. Hulse, T. Cawthron and W. Fearnhough.

SEWING and Embroidering.—J. Warwick, G. Browning and T. Morts, S. and A. Keats, W. H. Dorman.

SHIP and Boatbuilding, Ferries.—J. Parlour, B. J. B. Mills (com.), N. Stick, W. Reemey, R. H. Turnbull, T. Cornish, R. and J. Jones, J. H. Johnson (com.)

SIGNALS, Alarms, Communicating Apparatus, Conveying Sounds.—G. Skrivanoff, F. King and G. Green, J. H. Shoebotham, A. L. Warton and J. Dobson, E. G. Brewer (com.), W. Biddulph, W. T. Braham, C. J. A. Nicolet, M. C. and T. J. Denne, F. Harmant.

SYPHONS.—H. E. Cooper.

TELEGRAPHS; Telegraph Printing Apparatus.—G. Skrivanoff, T. M. Foote, E. George, J. W. Fuller, F. H. W. Higgins, R. Kendal.

TICKETS, Labels, &c.—E. A. Pallister, C. Hodges, A. Gorse.

TILLING and Cultivating, &c.—T. Turner, J. Wallace.

TOBACCO and Snuff, Cigars, Cigar-Holders, Pipe and Cigar-lighters, Smoking Pipes, Tobacco Pouches, &c.—J. Brindle.

TOYS.—W. R. Lake (com.)

TRAMWAYS and Tramway Carriages, Tramway Locomotives.—J. Hall, A. Fairlie, P. Burrell and H. Valpy.

TRAPS for Drains, &c.—J. W. Holland, D, Brown.

TRIMMINGS, &c.—A. G. Duncan (com.)

TURNING, Lathes, &c.—A. Muir, W. W. Hulse.

UMBRELLAS, Parasols, &c.—H. Skerrett, W. R. Lake (com.), G. Lasher, E. Edmonds (com.)

UPHOLSTERY.—J. B. Rowcliffe.

VALVES, Taps, Stop Cocks, Plugs; Regulating the Flow and Pressure of Fluids.—H. Simon, J. and R. Crighton, and P. Chell, S. Hallam, J. A. Muller, J. Burr, H. J. Haddan (com.)

VELOCIPEDES, Bicycles, &c.—L. O. Michael, W. E. Hart, T. Butler, J. Beale, T. Pritchard, F. Weatherill.

VENTILATION: Supplying and Purifying Air for Buildings, Mines, Ships, Carriages, &c. — J. H. Johnson (com.)

WASHING, Cleansing, and Wringing Fabrics, Yarns, and Materials.—W. Brierley, C. T. Bastand.

WINDOW Blinds and Sashes.—R. Carlyle.

⁂ *The above List is prepared from the Patent Records by Mr. T. Morgan, Secretary of the Inventors' Patentright Association, Limited.*

TECHNICAL EDUCATION.

THE Cutlers' Company announce that being desirous to render further assistance in the development of technical education, or a knowledge of the principles of science as applied to the materials used in the cutlery trade, they have arranged for a course of lectures being delivered, or paper read, at the hall of the company, Cloak-lane, Cannon-street, City, during the present season. It is proposed that the first course shall consist of four lectures or papers upon subjects intimately connected with the materials used in the manufacture of cutlery, and that they shall take place on the following days:—Wednesday, December 1st; Wednesday, January 5th; Wednesday, February 2nd; and Wednesday, March 2. With a view of assisting the company in the objects they have in view, Sir H. Bessemer, C.E., F.R.S., has kindly promised to commence the course, and will, on December 1st, read a paper "On the Manufacture and Uses of Steel, with Special Reference to its Employment for Edge Tools." The company invite the attendance and the cordial co-operation of manufacturers of cutlery, and through them that of their workmen and apprentices. The admission will be free, but by ticket.

SEVERAL objects formed from pure massive nickel have recently been submitted to the Société d'Encouragement, obtained not by electro-deposition, but by fusion and forging. Nickel possesses many properties that deserve attention from those engaged in industrial pursuits. For example, it is not liable to oxidation by atmospheric influence, nor under any ordinary circumstances. It is more infusible, malleable, and ductile than iron. These qualities, however, cannot be utilised, because it must be employed pure and under special conditions. If one-thousandth part of magnesium is thrown into the nickel at the moment of fusion, then the metal will possess all the malleability that can be desired. It may be drawn, rolled, or welded, and may be worked in any manner in which iron can be worked.

Reviews.

"London Smoke and Fog: With some Observations on 'the Country Parson's Grate' and other Modern Fireplaces. Being a Chapter from the Author's New Edition of his work on 'The Ventilation of Dwelling-houses and the Utilisation of Waste Heat from Open Fireplaces.'" By FREDERICK EDWARDS, Jun., author of "Our Domestic Fireplaces," "A Treatise on Smoky Chimneys," &c. London: Longmans, Green, and Co. 1880.

THE author states that the substance of this pamplet forms a chapter in the new edition of the author's book on "Ventilation and Heat," where illustrations are given. As attention has recently been called to the subjects of fog and smoke, and as few have opportunities of examining various treatises, it has seemed to the author that it might be of public benefit to publish this in a separate form.

As Mr. Edwards is, without doubt, an authority on stoves, grates, and chimneys, and whether he writes on these or on subjects on which his authority is nil, *ex cathedra* is his style. Therefore our readers must expect to find strong assertion, where they would perhaps expect explanation and arguments. What strikes us as curious, however, is the introduction of fog into the title of the pamphlet, because the following remarks in the introductory portion of the work is all we can see that gives any useful information as to fogs:—

The gloom of the winter of 1879-80 was so disheartening, so dangerous, and in each sense of the word so appalling, that on a recurrence of fog just recently, some have asked whether nothing can be done to relieve our metropolis from the pernicious smoke which in certain states of the atmosphere exposes us to a gloom seldom to be found elsewhere on the surface of the whole earth, and utterly unknown in the great cities of past times. Dr. Carpenter, of Croydon, has pointed out in the *Times* how we may leave such a place as Croydon with a clear sky and sunshine, and enter gradually an atmosphere that is utterly repulsive. Residents in most parts of the suburbs have had similar experience. The question how we are to deal with the smoke question has therefore been asked. Many answers may be given, but it is probable that not a single answer may be given that could at once be accepted as satisfactory, for the simple reason that it is beyond any man's power to suggest a remedy that could be speedy and complete in its application. As, therefore, it is useless to dream of impossibilities, we must be content to consider the only schemes which have the slightest appearance of being practicable.

One scheme is to warm our houses entirely by gas, but this scheme is met by exceedingly strong objections. The cost is very great, as gas has to be produced from coal, and we have to pay the expenses of manufacture, the expenses of supply, salaries of collectors, measurers, secretaries, and other officers, together with interest on money invested. Next, our houses are so constructed that we have incessant down draughts in some chimneys, rendering it scarcely possible in some cases to use a fire at all, and in all cases of down draught it would be impossible to use gas. We may just as well have a smoky room as a room filled with the products of combustion from a gas stove.

A second scheme is to burn coke or anthacite coal, but these are unfit for open fireplaces, as they are flameless and easily emit offensive products when not burnt in stoves specially constructed for them.

A third scheme is to levy a tax on all open fireplaces, but this is so opposed to our habits that we can hardly conceive a proposition that would be more unpopular.

A fourth scheme is to heat a large number of houses, say 20, 50, 100, or more, from a single source, by means of hot water-pipes, steam-pipes, or heated air, the furnace to supply the hot water, steam, or warmed air, being under the control of a superintending engineer and fireman. The author has discussed the scheme in previous volumes, but the only attempt to carry out the suggestion, so far as he has heard of, has been at Lockport, in the United States, where as many as 200 houses have been heated, supplied with hot water, and heat for cooking from a single source. This plan was described by Mr. George Maw, F.G.S., in a letter to the *Times* some two or three years ago. The difficulty of applying this system to existing houses appears to be overwhelming. It could, therefore, only be attempted in new districts as at Lockport, and by capitalists of good intelligence and enterprise.

A fifth scheme is to heat our houses entirely by hot water, steam, or hot air, having a furnace in the basement, a single furnace chimney, and requiring under penalties that this furnace should be so constructed and used as to consume smoke.

As these schemes appear to afford us no prospect of relief whatever, so far as this great metropolis is concerned, we may turn to a last scheme, which, though it may afford us no immediate prospect of relief, may not be so hopelessly unpromising as the five schemes mentioned above, and be well worthy, therefore, of very serious consideration.

This is the scheme introduced by Mr. John Cutler in 1815, and by Dr. Neil Arnott in 1854, of burning a fire from the top downwards. A box below the fire bars is charged with fuel, a fire is made on the top of the body of fuel and the fire burns gradually downwards like a torch or a candle, a poker being used now and then to separate the caking coal and allow air to enter with requisite freedom, By Mr. Cutler's and Dr. Arnott's plan the coal was raised up to the fire bars from a box placed beneath them. By Mr. Young's plan the coal was screwed up into the fire from a trough placed on the hearth in front of the fire. By the present writer's plan a door is pushed down in front of the burning fuel. The author need not go into the question of which is the best mode of carrying out the system. Each one can determine this for himself. He need only state what are the unquestionable results known to experienced persons who have used them for twenty-five years. These prove unquestionably that there need be no smoke after a fire is lighted in the morning, and that then only a thin film is to be observed from the chimney above. Also that a chimney in which this grate is used only requires sweeping once in seven years.[?] These two facts appear to be conclusive, and that we ought unquestionably to burn our coal from the top downwards instead of the reverse. The question as to the best appliance for doing it is another matter altogether.

Now as, notwithstanding Dr. Carpenter's assertions, it is not true that the recent prevalence of London fogs was essentially due to the smoke from the chimneys, because fogs were prevalent at times when there were fewer fires (as in June); thus it is clear that the subject of fogs is not to be disposed of by the production of a good stove and chimney.

WINTERING FLOWER ROOTS.—The roots of many useful and ornamental plants, such as cannas, dahlias, and gladiolus, may be safely wintered in dry soil by means of external coverings. But as they do not require light during the winter it is safer to lift and store them in a dry cellar or building from which frost is excluded. We find them to keep best, says an agricultural writer, packed in a soil just moist enough to keep the roots from swelling.

GEORGES PIERSON.

In the untimely death of Georges Pierson, in Paris, lately, France loses a brilliant genius ann a hard working scientific student. Four years ago he commenced a vast series of researches and experiments upon the natural rhythm of many languages and succeeded in discovering and establishing highly important relations, hitherto unknown. between rhythm and melody—*i.e.*, between the rapidity of vocal music and its modulations. These laws once established and systematized, he was naturally led to apply thom in elucidation of the fundamental basis of harmony itself, and found that they constitute a new and perfect theory of harmony, without any of the manifold irregularities and exceptions which encumber all previous theories. It amounted, in fact, to the creation of one more exact science, and the world will soon have the opportunity to test the claims made on M. Pierson's behalf by some of the most competent authorities, his work on "The Natural Rhythm of Language" being announced for speedy publication at the expense of the French Government. M. Pierson had gained renown as a philologist in the course of his studies on the philosophy of music, and had been offered a professional chair in the Dutch University of Groningen on the recommendation of Ernest Rénan. He had been employed by the Department of Public Instruction upon scientific commissions in Austria, and had been tendered his Algerian appointment in the hope that the climate of the colony would restore his health, shattered by too constant labour. He died at the early age of twenty-nine years.

THE GOVERNMENT AND THE TELEPHONE.

Is a telephone a telegraph? This is the question which has been exercising the intellect of the Exchequer Division of the High Court of Justice. It is not so very long since the stories that came to England from the United States regarding the achievements of the telephone were set down with a sort of wondering incredulity as belonging most probably to the marvels of American fable; but there is now an Edison Telephone Company of London, and it is against this company that the Attorney-General is invoking the assistance of the law on behalf of the Crown. The Crown contends that the working of the telephone for gain is an infringement of the monopoly possessed by Government for the transmission of telegraphic messages. The Government holds its monopoly under the Acts of Parliament which describe telegraphs as "electric or other telegraphs or mechanical engines," and which define the term "telegraphic" as intended to include any apparatus for transmitting messages or other communications by means of electric signals. Edison's instrument is termed, in the specificatious of the Letters Patent, "the speaking or telephone apparatus," "a telegraph operated by sound," "an instrument for transmitting sound by electricity," and so forth. In these terms lies the gist of the legal contention. The Attorney-General comes to Court on behalf of the Crown and says that the messages conveyed by Edison's instruments, which, it is alleged, comprise a wire extending from a sending to a receiving station, are telegraphic messages, and are conveyed by electricity, and that, with these instruments, the mechanical agency is the voice of the person transmitting the message, while in the case of the other telegraphs the mechanical agency is the hand.

The Court which is the arena of this curious contention appears to have been rendered lively by a display of the marvellous machines that have been constructed for the reproduction of the sound of the human voice. The points at issue, though in appearance verbal, are in reality of far more substantial character. The Attorney-General asks the Court in effect to decide that the wires used by the Edison Company are telegraphs, and that the messages conveyed by the wires are telegrams, and that thus the working of the Edison instruments upon any terms under which money or other consideration is paid is an invasion of the exclusive privilege created for the Government by the Act of Parliament under which the Crown acquired the telegraphs. But the company, while replying in particular to the several charges of the Attorney-General, raise what is in truth as large and momentous a question as any that can enter into such a case. Men of science must be left to say whether or no the combination of mechanical appliances and natural forces is so similar in the use of the telegraph and the telephone as to make the two devices for transmitting communications practically one thing; but the issue which is of general interest, and upon which popular opinion can be more easily formed, arises out of the question whether, at the time when Parliament passed the Telegraph Act of 1869, such a discovery as the telephone was contemplated, The defendants in this action urge that it was long after 1869, before any person had conceived it possible that the human voice could be so endued with the power of transcending distance that people might converse together through the aid of electricity when far away from one another.

It is natural to feel a deep interest in a case at once so curious and so significant of immense issues. The busy hands of science are breaking in with great rapidity the forces of nature to obedience to the human will, and in proportion as we learn to convert the elements to our use and to find the history of the many phenomena around us in a few primary powers, it is possible that a conflict of the rights of inventors will arise with increasing frequency. We have a limited knowledge, though we make a marvellous use, of the agency of electricity, and each practical adaptation of additions to our experience of so multiform a force is likely more and more to compete closely, and, at times, indistinguishably, with the contrivances that have forerun it. In the present case, whatever may be the decision of the Courts of law, examination will probably reveal considerations of a larger equity which no Government will disregard, and it is not to be feared that Mr. Fawcett would allow any general interests to suffer in his hands, or would be over eager to seek a harsh indulgence of his legal rights.—*Times.*

THE EXPANSION OF STEAM.

By Professor R. H. Thurston.

We quote the following from our contemporary, the *Scientific American*, as giving much information on the above subject in a concise form.

A correspondent writes me asking the following question, requesting me to reply by sending an article to the *Scientific American*, "which," as he says for himself and shopmates, "we all read, and where we shall all be sure to see it: What *is*, really, the proper point of cut off in steam engines to give maximum economy in dollars and cents?"

Some people say one thing and some another. In your History of the Steam Engine, page 475, you say about one-half the square root of the steam pressure is about right 'in general'; and a writer in the *Journal of the Franklin Institute* for June, who ought to understand the matter, says that the steam pressure divided by the back pressure gives the number of times to expand to secure maximum efficiency.

"Now, your rule would give, for a Corliss engine with 90 pounds of steam, a cut-off at one-fifth, while the last would make it one-seventh. Then again, for an old fashioned engine with condenser, cutting off steam at 25 pounds, your rule makes it about one-third, and the other says one-fifteenth or even one-twentieth, which I know by experience cannot be right."

Ans. The point of cut-off giving maximum economy in steam engines is never precisely the same in any two engines. It will vary with every change of type, with every change of pressure of steam, with every difference in piston speed, and even in two engines built from the same drawings and made from the same pattern, the degree of expansion being the same, the two machines will demand different quantities of steam.

Could all the conditions affecting the expenditure of heat in the production of power be made absolutely invariable, the point of cut-off for maximum efficiency could be determined for those conditions—not by calculation, but by experiment; and it would remain the same just as long as those conditions could be maintained absolutely the same. But this never occurs in practice.

Steam enters the cylinder sometimes barely dry, sometimes superheated, sometimes damp with watery vapour, and often mingled with water to the extent of ten or twenty per cent.; it even sometimes carries with it more than its own weight of water. It sometimes comes in contact with hot and nearly dry metallic surfaces, which aid in keeping it in a state of maximum efficiency; but it oftener, in fact usually, meets an interior filled with damp chilling vapours, and surrounden by walls cool enough to condense a considerable part of the steam supplied up to the point of cut-off. During expansion the steam never follows precisely the law of expanding permanent gases—with which the pressure diminishes precisely in the proportion in which volume increases—but, by condensation at first and by re-evaporation later in the stroke, the expansion line falls below at first and then rises above the curve expressing Mariotte's and Boyle's law, although frequently approaching that curve pretty closely. If the engine speed increases the steam is usually less affected by causes producing loss; if the speed decreases a loss of economy generally ensues. Large engines are less subject to such losses than small ones, and every reduction in the amount of engine friction permits a closer approximation to theoretical conditions.

It is easy to determine the proper point of cut-off for any defined set of conditions provided they are such as can be mathematically expressed, and the larger the engine, the hotter the steam used, the higher the piston speed, the less the friction, and the more perfect the system of lagging and steam jacketing, the more nearly will the actual correspond with the estimated value; but the theoretical rate of expansion is rarely very nearly attained in our very best practice, and experience shows that we must usually content ourselves with a vastly smaller degree of economy by expansion than would be mathematically predicted.

Instead of cutting off at one-twentieth when using steam at 45 pounds pressure in a single cylinder condensing engine, we find that a cut-off of at most one-fourth gives, in practice with ordinarily good engines of moderate size, the best results.

In handling non-condensing engines of two or three hundred horse power, with steam at 60 to 90 pounds and a speed of piston of about 500 feet per minute, and using the standard forms of "drop cut-off" familiar to American engineers, we can barely gain by expanding more than five times.

"In general," taking engines of the best makers, as I have known and handled them, the best results have been, so far as I have observed them, obtained by expanding as many times as is represented by the product of one-half into the square root of the steam pressure in pounds on the square inch measured from the vacuum line, that is, $E=\frac{1}{2}\sqrt{P}$.

As pressures increase the benefit of condensation decreases, and it happens that this rule applies pretty closely both to the old-fashioned condensing steam engine with low steam, and to the modern American type of high pressure "automatic" cut-off engine.

Sometimes an engine is found to give maximum economy when expanding fifty per cent. more, that is, $E=\frac{3}{4}\sqrt{P}$.

No *theoretical* determination of the proper point of cut-off has ever been made that is of any service to the engineer. In "compound" engines of large size and high speed expansion can be carried much farther than in the older forms with single cylinder; but even they depart very greatly from the conditions assumed in calculation.

It thus happens that the benefit of expansive working has a limit which is very soon reached, and that the most radical practice, in which condensing engines are driven by steam of 450 pounds pressure, instead of expanding a hundred times, as would be indicated as proper by the purely mathematical analysis referred to by my correspondent, is limited to an efficient expansion of about twenty times, and probably gives best results with still less expansion. The fact is that no device yet invented has ever given a rough approximation to the efficiency indicated on purely theoretical grounds.

We are gradually learning more and more about the behaviour of steam in the engine, and are in our every-day practice, as illustrated by the best builders, keeping very close to what is, all things considered, the line of true economy.

Single cylinders are still doing, at their best, about the same work as the best compound engines, and are rarely made to expand, when condensing, nearly to the back pressure, and the best non-condensing engines hold the expansion line at its termination well above the atmospheric line. To double the rate of expansion in these engines would increase the weight and frictional resistances per horse power developed to so great an extent that this consideration alone forbids maximum expansion.

Steam jacketing and moderate superheating the steam are always sources of economy. A good single cylinder engine, with thorough steam jacketing, has been known to give an economy that is generally considered excellent at as low a rate of piston speed as 100 feet per minute, the coal consumed being but 2¼ pounds per horse power per hour.

Increased steam pressure benefits usually, but has its limits. I have known an engine of reputation, working with 250 to 300 pounds of steam, to require over 2½ pounds of good coal per hour per horse power, and its steam jacket proved quite unequal to the task of checking internal condensation. I have no doubt that a "longer cut-off"—the the steam was expanded only one-half as much as unchecked calculation would dictate—would have been better, and *perhaps* a less piston speed would have made the steam jacket more effective.

All these matters must be finally settled by experience.

Guatemala's Exhibition.—The largest and most enterprising of the Central American States, Guatemala, has entered the list of exhibitors, and announces the intention of holding an industrial exhibition in 1882. This is likely to furnish American manufacturers of articles suitable for the markets of that region a convenient opportunity for placing their products in a favourable way before the Guatemalan dealers and consumers.

RECENT AMERICAN AND FOREIGN INVENTIONS.

An improved ladies' dress guard, which will prevent the dress from clinging to and exposing the form when walking against the wind, has been patented by Tom O. Memery, of Key West, Fla. It consists of a rounded garment, stiffened by a number of flexible strips running from top to bottom. It is worn over the abdomen, and is held by bands passing around the waist.

An improved horse hay rake of that form in which a revolving rake having teeth on opposite sides of its centre is connected to an axle mounted on a set of running wheels and is provided with stop devices, which either hold the rake rigid while it is gathering the load or may be released to allow the rake to revolve and the load to be dumped, has been patented by Messrs. Isaac Q. Willliams and Gustavus H. Osborn, of Goshen, Ark.

Mr. Eugene H. Angamar, of New Orleans, La., has patented a simple and effective apparatus for *freeing railroad tracks* from snow and ice by heat, more especially street railroads; and the invention consists in a truck fitted for running on the track and supported on hollow wheels, which are fitted with grates for burning fuel, and perforated so that the wheels may be highly heated.

Mr. Hilliard B. Smith, of Stephenville, Texas, has patented an improvement in *wind wheels* which consists in a novel arrangement and combination of wings or gates in a casing outside and independent of the wheel, whereby provision is made for adjusting the position of the wings, and consequently regulating the speed of the wheel, according to the force of the wind.

An improvement in *rotary blowers* has been patented by Mr. Charles A. Smith, of Philadelphia, Pa. This invention consists in certain novel details of construction and arrangement of parts which cannot be readily described without an engraving.

Messrs. Conrad Elmbeck and Fritz Wehrmann, of Newhaven, Mo., have patented an *improved coupling* for connecting the forward axles and the bodies of buggies, buckboard wagons, and other vehicles, so constructed as to give the axle a free vertical and horizontal play, and thus better adapt the vehicles for use upon rough, uneven, and sideling roads.

An improved machine for *framing timber* has been patented by Mr. Richard H. Watson, of Leadville, Col. This machine is intended to accomplish by power the work of framing timber used in mines, shafts, tunnels, and similar underground works. The inventor makes use of a suspended carriage or frame fitted for movement in vertical guides and carrying two horizontal saw arbors fitted at right angles. This is combined with a bed carrying adjustable head and tail blocks for holding the timber and presenting it properly to the saws. A winding drum and friction pulleys feed the saws, and devices of novel character center and clamp the timber.

An improvement in that class of *windmills* in which the wheel is inclosed in a cowl, has been patented by Mr. Albert S. Dimock, of Hutchinson, Kan.

An improved *lifting jack* has been patented by Mr. John Parr, of New York city. The object of this invention is to construct a jack that can be made to press both upward and downward at the same time, or to operate either upward or downward, as may be desired.

An improvement in the class of *targets* which are constructed of movable parts and connected in an electrical circuit with an instrument which is located at or near the place where the shots are fired, and is adapted to indicate the portions of the target struck by balls or bullets, has been patented by Mr. Morris Ullman, of Alexandria, Va.

A machine for *bending shafts or thills* for buggies and other vehicles has been patented by Mr. John H. Smith, of Bluffton, Ind. The invention consists in a novel construction and arrangement of straps and formers, a screw, a cam lever, and a frame or table, whereby provision is made for simultaneously bending the heel and the point of both of the shafts of a pair.

Mr. Henry Schlimme, of Wiconisco, Pa., has patented a simple and durable *tuyere* for blacksmith's forges and the like. It consists in a bored cylinder provided with water chambers, longitudinal blast opening, a blast pipe and sliding valve, and water feeding pipes.

An improvement in *fences* has been patented by Mr. Joel D. Olinger, of Water Valley, Miss. The object of this invention is to construct fences so that they can be readily moved from place to place, and to make them strong, durable, and less expensive in construction than fences made in the ordinary manner.

An improved *thill coupling* has been patented by Mr. James S. Welch, of Dodge City, Kansas. In this invention the conical bolt which holds the thill iron is considerably longer than the width of the thill iron, and the latter is constantly pushed toward the larger end of the bolt by a U-shaped spring.

Mr. Marcus M. Rhodes, of Taunton, Mass., has patented an improved apparatus for *gauging* and *assorting* disks of varying thickness, for *coins*, *buttons*, and other purposes. The invention consists of an improved mechanism for feeding disks or planchets, to gauging calipers of a sliding spring caliper bar, the range of whose every movement is determined by the thickness of the disk being gauged, and a group of receiving tubes reciprocrated beneath the calipers by novel mechanism.

An improved *wrench* or *pipe-tongs* that may be adjusted without screws has been patented by Mr. Theodore P. Franke, of Buffalo, N.Y. The invention consists of a hollow internally-socketed handle, containing in its upper section a movable serrated lower jaw resting upon a spiral spring, and adjustable by means of a rod that passes up through the handle.

Messrs. James B. Campbell and Josiah Lindsay, of Mount Sterling, Ky., have patented a cheap and durable *wash-board*, designed to force the water through the clothes by a more substantial resistance to the hand than is afforded by other wash-boards. The invention consists of metal rods running laterally across the face of the board, parallel to each other and at equal distances apart, and partly bedded in the board, grooves being made in the spaces between the rods, thus substituting the rods and the grooves between them for the corrugated metal sheet which commonly covers the face of a wash board.

An improved vehicle wheel has been patented by Mr. Charles W. Ball, of Macon, Ill. The object of this invention is to construct a light, durable, and easily adjusted *vehicle wheel*, cast from steel or other metal, with hub, spokes, and felly all in one piece.

Mr. Paul Gondolo, of Paris, France, has patented an improved process of manufacturing *tannin extracts*, which consists in the following consecutive steps:—First, macerating the crude material containing the tannin in slightly acidulated water; secondly, neutralising the free acid by an alkali or its equivalent, as described; thirdly, clarifying the solution by the introduction of blood, and then raising the temperature to the coagulating point of the blood, and finally separating from the tannin liquor the coagulated blood, with the salts and colouring matter, by filtration.

An improvement in *oil stills*, patented by Mr. Gerard Crane, of Salamanca, N. Y., consists in a novel arrangement of a small still within a larger or main still, and another small still outside of the main still, and a novel combination and arrangement of devices employed in connection therewith, whereby the process of distilling the oil is facilitated and hastened by enabling the oil to give off the more volatile products of distillation at the same time that the heavier products are being given off, and by means of the same fire for all the stills.

An improvement in that class of devices known to the public as "*bale-band tighteners*," has been patented by Mr. Charles T. Christmas, of Rivertan, Miss. It consists of two end-curved and cross-pivoted bars, having on corresponding sides of the ends a swivelled slotted block and cam lever.

Mr. Gilman P. Richardson, of Bath, Me., has patented an improved means for fastening together the ends of the metal bands which serve to bind together the *staves of large tanks, barrels, hogsheads, or tubs*. It is made in the form of two strong tubes cast together, with their axes arranged obliquely to each other. Through the tubular openings in the tie the rounded ends of the band are to be projected, and then secured upon the opposite sides of the tie by screw nuts.

Mr. Montraville W. Atwood, of Clayton, N. Y., has patented a cenre-board that may be applied to any *boat*, but it is specially adapted to a row-boat, without interfering with the oarsmen, and be contained within a box that is water-tight, excepting at its bottom or keel opening, which box may be arranged beneath thwart of the boat. It consists of a centre-board constructed of two or more pieces or leaves, so that they may be folded and opened and elevated and depressed at pleasure by means of a bolt and lever, the centre-board being contained in a low water-tight box above the bottom of the boat.

An improved spring hinge has been patented by Mr. George Keene, of Chicago, Ill. The improvement consists in placing the pintles of the gate or door forward of its rear edge, which is provided with a downward projection, and in applying a spiral spring to the lower pintle, so that its free ends project backward on each side of the projection on the gate or door, but do not bear against it except when the gate or door swings, being at other times in contact with studs which are fixed in the pintle bracket.

A shoe nail for the channels of boots or shoes roughened on its shanks, having a body slightly tapered on two of its opposite sides, but drawn from the middle of the other two opposite sides to form an entering point, and provided with an elongated or diamond-shaped head, has been patented by Mr. John Hyslop, jun., of Abington, Mass.

Mr. Charles L. Norton, of New York City, has patented an improved *spring clip for indexing books*, which is both simple and convenient. It consists in a clip of spring metal with sides of unequal length, and having a sharp bend near the end, and an index letter stamped on the part between the bend and the end of the clip, so that the clip can be placed on the end of a page with the lettered part projecting outward, thus indicating the index divisions of the book.

A *register* for registering the number *of fares* deposited in the fare boxes used in street railway cars, stages, and for other purposes, has been patented by Mr. Joseph N. Hordy, of New Orleans, La. The invention consists of a toothed cylinder pivoted in the lower part of the fare box below the tilting trap. The shaft of this toothed cylinder is connected with an index on a circular dial, so that as the cylinder revolves it turns the index, which shows on the dial the number of fares paid.

Mr. Bernhard von Schenk, of Heidelberg, Germany, has patented a *mass for manufacturing plastic objects*, consisting of sulphate of lime nine and a half parts, coal or coke one part, and iron shales sixty-hundredths of a part.

The Scientific Review

AND

SCIENTIFIC AND LITERARY REVIEW,

A RECORD OF PROGRESS IN

ARTS, INDUSTRY, AND MANUFACTURES,

INCORPORATING THE

JOURNAL OF THE INVENTORS' INSTITUTE,

(*Established* 1865.)

Is published in the first week of every month at the

OFFICES, 21, COCKSPUR STREET, CHARING CROSS, LONDON, S.W.

The Scientific Review will be sent post free on prepayment of the Annual Subscription of 6s. 6d.; or it may be had wholesale from Messrs. KENT and CO., Paternoster Row, or through any Bookseller or Newsagent in the kingdom, price 6d. per copy. Single copy post free from the office, 6½d.

The Scientific Review, having an old-established circulation, and being well read by Manufacturers, Capitalists, and others interested in inventions and enterprises for the promotion of industry, will be found a desirable medium to many Advertisers.

All Communications for Publication, Books for Review, and letters respecting Advertisements, Subscriptions, &c.—to be forwarded to the

Editor: 21, Cockspur Street, Charing Cross, S.W.

And if for notice in the next issue, before the 25th instant.

THE INVENTOR'S INSTITUTE,

4, ST. MARTIN'S PLACE, TRAFALGAR SQUARE, LONDON.

Established 1st May, 1862.

Past Presidents:

Sir David Brewster, K.H., LL.D., F.R.S., &c., from the establishment of the Inventors' Institute, till his decease, February, 1868. Lord Richard Grosvenor, M.P.

President, SIR ANTONIO BRADY.

SESSION 1880—1881.

Members' Meetings at 8 p.m. on Thursdays, December 9th and 30th (Council Meeting); January 13th and 27th; February 10th and 24th; March 10th and 24th; April 7th and 28th; May 12th and 26th; and June 9th.

Annual General Meeting, Thursday, May 26th, at 4 p.m., unless otherwise arranged.

Subscriptions are payable to Mr. G. A. Stretton, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts.

F. W. Campin, Sec.

Monthly Notices.

Mr. Edison, in the *North American Review,* has an article on his system of domestic electric lighting. He now uses for the production of his incandescent light loops of carbon prepared from a Japanese bamboo, enclosed in oval bulbs of glass from which the air is exhausted. He proposes that the electricity employed for illumination at night should be used as a motive power during the day.

The Royal Society, on St. Andrew's Day, November 30th, held their anniversary meeting, and the Council elected for the year ensuing as follows:—President, W. Spottiswoode; Treasurer, J. Evans; Secretaries, Prof. G. G. Stokes and Prof. T. H. Huxley; Foreign Secretary, Prof. A. W. Williamson; other members of the Council, W. H. Barlow, Rev. Prof. T. G. Bonney, G. Busk, Right Hon. Sir R. A. Cross, E. Dunkin, A. J. Ellis, T. A. Hirst, W. Huggins, Prof. J. Marshall, Prof. D. Oliver, Prof. A. Newton, Prof. W. Odling, H. T. Stainton, Sir J. Paget, Bart., W. H. Perkin, and Lieut.-General R. Strachey.

Light and Germination.—M. Panchon on October 26th made an interesting communication to the Académie des Sciences on the influence of light on germination. He measured the quantities of oxygen absorbed by identical lots of seeds in light and darkness. Light accelerates the absorption in a very constant manner, regulated by the degree of illumination, the absorption being accelerated by low temperatures. M. Panchon states that the absorptive acceleration produced by daylight is continued for several hours in darkness.—*Athenæum.*

Dr. Salvator Vinci, of Catania, announces to scientific societies, by "proclamation," that a great revolution in the physical sciences is at hand, and that he has discovered, and will demonstrate ere long by indubitable and invincible proofs, that the essence of heat, of light, of electricity, of magnetism, and of life is—oxygen.

The new serial story in the *Quiver,* entitled "In Vanity and Vexation," which is already exciting a very strong interest, although the first instalment has so far appeared, is from the pen of the popular author of "Lost in the Winning," a story which achieved a remarkable success a few years ago in the same magazine.

Aural Defects of Engine Drivers.—Prof. Moor, of Heidelberg, at a recent congress of orology, held at Milan, showed an excellent preparation of a portion of the ear, and gave statistics showing that engine-drivers on railways are peculiarly subject to certain affections of that organ, which might compromise the safety of travellers. The congress moved an address to all Governments recommending serious periodical investigations into this matter.

Ronald's Library has recently been opened at the rooms of the Society of Telegraph Engineers.

Spallanzani, the celebrated professor of natural history at Padua, who died on the 30th of February, 1799, is at last likely to have a monument to his memory erected in his native town, Scandiano, in the duchy of Modena, where he was born on the 12th of January, 1729. The secretary of the Académie des Sciences, at the Séance of October 26th, announced the opening of a subscription for this purpose.

Meteorological station on the Highlands.—A project is on foot for the erection of a meteorological station on Ben Nevis, as a public acknowledgment of the services of Mr. David Hutcheson to the Highlands. The committee already includes the Duke of Argyll, the Earl of Breadalbane, Mr. Milne Home, Dr. Angus Smith, F.R.S., &c. The Royal Society of London, the Meteorological Department of the Board of Trade, and other public bodies, have warmly advocated such a Highland station as a scheme of national value and importance.

The Lancet understands that Mr. Joseph Lister, F.R.S., has been nominated by the council of the Clinical Society for the office of president; and that Dr. S. Wilks has been similarly nominated by the Council of the Pathological Society.

THE SCIENTIFIC REVIEW
AND
Scientific and Literary Review

DECEMBER, 1880.

INVENTORS' DINNER, 1880.

On Thursday, 25th Nov., 1880, the Dinner of the Inventors, Friends of the Inventors' Cause, and Members of the Inventors' Institute, was held at St James's Hall, Piccadilly.

Sir Antonio Brady, President of the Inventors' Institute, took the Chair, and was supported by Vice Presidents, Admiral J. H. Selwyn, Dr. C. Siemens, F.R.S., and Mr. Cromwell F. Varley, F.R.S., and by the following Members of the Council of the Institute, viz., Messrs. Newton Wilson, T. Paterson T. Morgan, and F. H. Varley, and Mr. F. W. Campin, Secretary of the Inventors' Institute. Also amongst those present were Mr. W. Chesterman, Master Cutler of Sheffield, Mr. E. J. Watherston, Mr. J. Standfield, C.E., Mr. J. J. Aston, Q.C., Mr. Kingzett, Mr. F. Mond, and the Honorary Secretaries of the Dinner Committee, Mr. H. G. Hellier, and Mr. Morgan. Dessert having commenced,

The Chairman gave the health of the Queen, with which he coupled the rest of the Royal Family. The toast was drunk with the usual honors.

The Chairman next proposed the "Army and Navy and Reserve Forces," which was received enthusiastically.

Admiral Selwyn, speaking to the toast, said he knew that a great many of those who had felt the benefit attending the operations of the Institute for years would be quite ready to support the toast. Inventors were very poor sticks indeed when separated, and if they had not had that happy union of the bundle of sticks, they would have missed that result which they saw now within their grasp. (Cheers.) It was the opinions which were expressed by sensible men such as Mr. Bramwell and others, the putting before the nation the importance of the subject, not as it affected inventors alone, but as it concerned the whole nation, which was likely to give to them as a unit of the nation that security of property which they might fairly claim. That Institute was not existing wholly or merely for the sake of Inventors, it was supported because those who joined it saw distinctly that the whole issue which it was fighting was one which meant the security and the progress of the whole nation. (Hear, hear.) If they were to take the next lowest ground it would probably be that occupied by the capitalist. In the United States the capitalist found a ready investment for his money, because he was secure of his title (hear, hear), and because he saw his own profit in the matter, and seeing that profit he furthers the profit of the nation too. It had been strongly put before them that we were in great need of new industries, and that without them we could scarcely hope long to keep in the position of the richest nation of the world. Since if we all paid for food grown abroad, and did not receive an equivalent for our industrial production, he need not tell them what the result would be. (Hear, hear.) That was the moral apotheosis of a nation where there is given to every man the exact compensation which his brain or manual labour deserved. In securing to him the results of the labour of his brain or his hands, they secured contentment in the State and respect and security for the property of others: and all those moral virtues which proceeded from a due appreciation of the meum and tuum principle. (Hear, hear.) And thus in a nation which respected property in every degree, whether property created by brain labour of novelists, as referred to by Mr. Cromwell Varley, or of the greatest inventors, like Sir H. Bessemer and Dr. Siemens, it would be found that a contented nation had been created; and that if all the existing property of a nation were in the hands of a few individuals, and if all were protected equally in the creation of that kind of property which did not previously exist, no one would seek to rob the other when each one could create property for himself. (Hear, hear.) If that Institute be the means of producing such a result of inducing nations and their governors to look higher than the mere fleeting interests of capitalists, at the broad interest of humanity, they would have laid the foundation of a much wider good for future life on this earth. (Hear, hear.) He called upon those who did not yet know the Institute to peruse its reports to see how, weakly and feebly it was true, but always consistently, they had advocated this cause, and to join them in their efforts, to give them strength and to help forward the movement for the advantage of the weak and helpless advocates of material progress against the strongly entrenched vested interests who opposed it. (Cheers.) Their old friend Mr. Broadhurst occupied a new position now; and he was sure that no nobler work could be proposed to himself by any member of the House of Commons than that which would produce contentment amongst all honest working men of a nation, not by strikes, not by feud amongst themselves or with their employers, not even by social revolutions could this be done, but by securing to every man that which he earned by his work of whatever kind. He hoped that everyone who knew how wide and how important their objects were would think it a duty to encourage by every means in his power, the support and the well being of the Institution—the Institute of Inventors. (Applause.)

The Chairman next gave the Health of the two Houses of Parliament, and congratulated the Inventors' Institute on having among them to-night Mr. Broadhurst, who was one of their oldest and most esteemed friends, and endeared to them by many ties, he being a very well instructed member of society which dealt with Patent Law; and it was to be argued from his presence to-night, and the Bill which he had introduced into Parliament on the subject which was so dear to the hearts of the members of the Institute, that they were on the eve of gaining that which they had aimed at for many years, viz., an amendment of the Patent Law. (Hear, hear.) He coupled the name of Mr. Broadhurst with the toast, which was drunk with enthusiasm.

Mr. Henry Broadhurst, M.P., in responding, said he was a very unworthy representative of their Parliament to undertake the duty of replying to the toast. He believed the present House of Commons was resolved to do justice to the English people of whatever class or shade of political opinion. He should not attempt to claim for the present House of Commons a great talent for inventive genius. (Laughter.) He hoped the House of Commons would prove to be full of worthy workmen in accomplishing the task the Institute had undertaken. (Hear, hear.) They were assembled together that evening to discuss rather the desirability of bringing the power of Parliament to redress the wrongs of whatever class. With respect to a reform of the Patent Laws, he thought they were occupying a better position to-night than they had done for some time past at their annual dinner. (Hear, hear.) He should be much mistaken indeed, if at that time next year they were not in a position to congratulate themselves and the Institute upon the passage of a good sound Patent Law Bill. (Cheers.) He need scarcely tell them that he was not in possession of the intention of the ministers as to the measure they meant to introduce next session, nor was he able to say that a Government Patent Bill would be brought forward; but he could say conscientiously, it was his firm conviction that a Bill would be introduced by the Government, with the clear and honest intention to carry that Bill through Parliament next Session. (Cheers,) Reform of the Patent Laws, in his judgment, surpassed all matters with regard to Foreign questions. (Hear, hear.) Those were all small matters of detail, which called forth the Fleet of Europe, and a mere pastime to play at. The difficuity was to get Parliament to think likewise. He believed that those who would be responsible partly for the measure, should one be introduced, were considerably more alive to the importance of the subject than they had been for years past. He had a conviction that they were prepared, if not to go the whole length of the Bill introduced by Mr. Anderson, to take that Bill as a basis for a Government measure. It would be remembered that that Bill proposed that the application for protection should cost only ten shillings; the second process should be ten shillings only, and the higher payments should be reduced to £20, and the other two to two £40 payments. Those sums in the aggregate were considerably less than the present charges. Whether they would obtain all that Mr. Anderson proposed, he was not quite clear. He was convinced that Mr. Anderson's proposals were nothing like sufficiently Liberal. (Hear, hear.) But in Parliament it was necessary to trim proposals down to such proportions as were likely to pass through the legislative machine, and if too radical a reform were proposed in the Patent Laws, they would be put down as mad inventors, and no one would listen to them for a moment. (Hear, hear.) If, however, a Bill could be obtained upon the basis of Mr. Anderson's proposals it would be a great advance. He would venture to say that even if a discussion on the subject of the Patent Laws could be obtained in Parliament, it would be such an educational advantage to the country, that then another Bill for giving still more liberal terms to poor inventors, would be considerably easier to pass through Parliament than the present measure. (Hear, hear.) The great difficulty was to get people to know its immense importance, and to understand its great value. (Hear, hear.) He quite agreed that when they gave reins to their fancy as to the value of inventions to this country, and as to the value which had been absolutely destroyed through the prohibitive tariff of the Government, it was something astonishing (hear. hear), and if the British public could only be sufficiently interested on the subject, he would undertake to say that no Government could live that did not apply itself to simplifying and cheapening our Patent Laws. (Cheers.) He found from returns put into his hands, that the American people had issued nearly 13,000 patents during 1879; while England had only issued some 3,500. Surely we were as inventive a people as those of the United States. (Hear, hear.) As a fact, unless a man was a small capitalist, or had a capitalist at his back to assist him, he could not possibly bring his inventions out in this country. (Hear, hear.) He declared that they were perfectly justified in forcing the question upon the attention of the Government, not only from personal interest, but for the fact that it was patriotic work that they were doing (hear, hear,) when they considered how every day this country was being placed more and more in competition with the productive nations of the world, and how every year increased the necessity for England relying upon her manufacturing rather than upon agricultural productions (hear, hear,) it became more and more urgent that we should encourage by every possible means, every little inventive faculty that developed itself amongst our people (hear, hear); instead of that our Laws at the present moment were doing their best to smother them. (Cheers.) He was discussing this matter with a gentleman of very great influence and high position in the House of Commons, who suggested that in discussing the subject and getting it on the programme of Legislation, they must consult the Treasury, because the Treasury was largely interested in the revenues at present derived from Patents. He suggested that they had better lose the revenue from the income on Patents, and even put it on beer, if necessary, rather than extract it from its present source. (Hear, hear.) If they would remove the shackles from our inventive people, the revenue instead of being what it was at present—a bare trifle compared with our income and expenditure —would double and treble itself in a few years in revenue alone, to say nothing of the immense increase of permanent wealth to the country (cheers) which would be derived from increased machinery and increased labour saving arrangements. The subject was one of national importance. (Hear, hear.) He promised to give their cause his heartiest support in Parliament, and to use what influence he could on the subject with those in authority. He believed that improved Patent Laws would promote a great increase of labour throughout the country, and greater income from industrial resources, and a greater revenue to the Exchequer from inventors' fees, (Hear, hear.) He hoped they would all live long enough to see the cause which they had met to celebrate, triumphant by the passing of a just and necessary reform of the laws of our country. (Applause.)

THE CHAIRMAN, in proposing "The Inventors' Cause," thanked Mr. Broadhurst for having said so much of what he himself intended to refer to. We lived in times when we were face to face with great depression in trade. The question was how to revive it. A friend at the Cobden Club had recently written to the farmers of Western America asking them not to vote for any member of Congress who would not go in for doing away with protection. The protection we had to contend with in America was a serious thing for our artizans and manufacturers and our trade in general. (Hear, hear.) His friend, in proposing that they should do away with protection had not suggested the right remedy, for it had called forth from America a reply which was the most exhaustive and triumphant defence of their protective policy that had ever fallen under his observation. His friend showed that the American object in their protective policy was to promote their local and their home manufactures. They wanted to create a home trade. They said in a pamphlet that our coal fields and iron mines are becoming exhausted, that our coal fields were becoming so deep that it was only at great expense the minerals could be raised to the top. He himself had been three times to America, and he had been appalled at seeing the marvellous means those people had of competing with us. (Hear, hear.) We had formerly the best artizans, the best genius, the best iron and coal and land in the world; but those Americans, since the Exhibition of 1851, had opened the eyes of the old and the shortcomings of other nations which had set themselves to remedy the defects under which they were labouring. In America he found that we were competing not only with a protection tariff of thirty, forty, and in some instances fifty per cent., but that we were competing with a country which Providence had blessed with the means of production which outshone any other country. He saw thousands of square miles of coal on the surface or on the side of the hills, and ironstone of the most magnificent quality, and hematite, one of the most valuable forms of mineral ore that we could possess. They could make Bessemer steel without any difficulty with the coal which was interlaced with them 60 or 70 or 80 feet in thickness, above the water level, only requiring to be put on to a railway or on navigable rivers, navigable for 20,000 miles. Not only so, but we had to compete with a country where the railways cut through coal fields of 12ft. thick, where the coal was in such abundance as to last for years, and where the production of the soil was so good that they were able to produce 60, 70, or 80 and in many cases 100 bushels per acre. Coal there, like every other commodity, had no value unless it could find a market, and this difficulty the Americans were gradually removing by opening up railways and water communications to the markets of the world. The strata of coal was so favoured by nature that they had nothing to do but to send it to bank by a certain gradient, and it travelled by gravity. They had not to hoist 600 fathoms from the bowels of the earth. They had all those advantages with which we have to contend with as difficulties. Therefore they could produce iron and all the necessaries of life in a way that we have no conception of. Consequently the manufacturer of this country had not only to compete with a high protective duty, but with large natural resources, and which could only be competed with by improved education of our artizans by imparting technical knowledge and by promoting the genius of our people for inventions to the utmost — (Cheers,) — and the improving and cheapening of tools for the cheapening of labour. (Hear, hear.) Therefore he urged that the question which the Inventors' Institute advocated was not a narrow one, but a national question. (Cheers.) It involved not only the safety of our country, because we could not grow enough corn in this country—we were obliged to import, and unless we could pay for it by our manufactures our country would get poorer day by day. (Hear, hear.) The only possible remedy was to encourage the inventive genius of our people; and he was sure the Anglo-Saxon race, if they had the same advantages of education, would give a good account of themselves if their genius were not wasted by Patent Laws which required £175 in fees, and then had only a license to go to law. (Loud cheers.) In America he enquired into the Patent Law in force there, and found that a patent could be got for £7, and recently the American Government were so alive to the necessity of patent inventions that they said they had no right to make the enormous profit they did out of Patent Laws. (Hear, hear.) The £7 charged was too much, and they were proposing to reduce it to £3 10s. (Cheers.) He believed so truly in the Anglo-Saxon race that providing they were given liberty and were not overweighed with objectional taxes that we should hold our own in the race of the world. (Hear, hear.) They were that day burdened with the most iniquitous tax ever levied upon the brains of our people—the £175,000 paid for patent fees into the public exchequer. (Hear, hear.) Any Chancellor of the Exchequer who hesitated to renounce that profit would be one of the most wicked Chancellors ever seen. It was a tax on knowledge and on the inventive genius of our people, and lost tens of thousands to the trade and commerce of the country. If the Chancellor of the Exchequer would reduce the tax to the form which that institution recommended it would benefit the nation and bring an increased revenue. (Cheers.) Therefore he felt the Institute was doing a great work in trying to press upon the Government the necessity of a cheap and good Patent Law. (Hear, hear.) The present system of merely a license to go to law was not the way to improve the trade of the country. As an instance of the bad patent laws of other countries injuring the commerce of the country, he referred to Dr. Siemens, who came over from Germany with his invention, which had benefitted the whole nation, becase Germany at that time had not such a good Patent Law as we had. If we were to enjoy the blessings we wished we must improve our Patent Laws, and not levy duties upon the brains of our people. (Hear, hear.) In asking them to drink to the inventors' cause he believed it was a national one, and the only cause which would enable this country to hold its own in the future competition with the world. (Loud applause.)

The toast was drunk with all honours.

The Chairman called upon Dr. Siemens to respond to the toast.

Dr. Siemens remarked that the Patent Law of this country was of particular interest to himself. It was the cause of his coming over to this country and to make it his home. Thirty-six years ago he took out his first patent; since then he had taken out many others. He thought the revenue which had accrued to the exchequer during his 36 years residence here would make up a nice sum. However, he would not complain, for all inventors had hard times to fight through, but if they only threw that perseverance into the work for which this nation were so famous they were sure to succeed in the end. The Patent Law as it stood was good in some respects. Any person had a right to obtain a patent, but on the other hand he had to pay for his privilege. As the Chairman said, after all, from a legal point of view, it was nothing but a license to go to law upon. (Hear, hear.) To his fellow inventors he cautioned them to avoid the law as much as possible. (Hear, hear.) There were generally two ways of settling a difficulty. The one was to strip and fight, which, although perhaps more congenial to the impulse of the moment, was a great loss of mental and physical power, and financial energy; and often one's views might be modified considerably if brought to the touchstone of a very dry and impartial investigation. (Hear, hear.) He always found it better for those differing from him to meet him in a spirit consistent with right and moral feeling, and by so doing the law courts were avoided, which he detested more than any other place. Previous speakers had already pointed out forcibly certain great defects in the law at present, Its chief fault was its costliness to the poor inventor, who ought to be encouraged by all means to obtain security for his invention. (Hear, hear.) Not only should he be assisted in making things easy for him as regards payment, but what was of still more importance, he should be assisted by timely advice. (Hear, hear.) If he went to the Patent Office and put in a provisional specification, nobody could tell him exactly whether the thought which had struck him at the time was nothing more than a new or old thought. The chances were that it was not a new thought, because bright thoughts cross so many minds. But, however, the Chancellor of the Exchequer says, "Pay your money and take your choice." (Laughter and hear, hear.) That meant £180,000 a year, and it was worth having. Now, every man ought to do something for the money he receives, and the Government in receiving those heavy fees ought in common justice tell the inventor whether he was likely to spend his money profitably or not. (Hear, hear.) There were the means at their command to do that if they would put the law in force which provided that there should be a good Patent Library. (Hear, hear.) It was better than it used to be, but much remained to improve the machinery of the library (Hear, hear). The law speaks of a Patent Museum. Well, if any of them had been to South Kensington and looked into the wild and dingy assemblage of most valuable old models—and some of them were exceedingly valuable—but to call it a Patent Museum was a farce. A Patent Museum ought to show every invention of any importance that had ever been made. (Hear, hear.) If they merely picked up chance things and stuck them there they were of no use whatever. It might gratify sightseers, but was no use to inventors. If there were to be such a thing as a Patent Museum make it a reality instead of a sham. (Cheers.) There were Commissioners named by the law who had never been provided, for the reason that if they were appointed they would be expected to do the work, and the work was not to be done. There was a certain examination by the Crown officers, who were utterly incapacitated from their business to do anything for the patent business except pocketing the fees. (Hear, hear.) Those officers looked at the form of the application, and if it was on the right sort of paper, and written in a proper manner, and did not contain a contradiction on the face of it, they passed it as a good application, and granted the patent. (Hear, hear.) Now, instead of that, if persons were appointed who would search the Patent Library and point out to the applicant what ideas had gone before him in the same direction without asserting the right of absolutely dictating to him, but simply advising him on what had gone before, it would save many, himself included, the great trouble, expense, and inconvenience of having gone to the Patent Office and made a false step. (Hear, hear.) He thought there were those important duties to be performed for which we paid enormously, and which were not performed according to the present law. (Cheers.) The question of expense came next. The patent fees could only be justified on the score of providing for the convenience of intending patentees the necessary information. (Hear, hear.) For any other reason it would be a most iniquitous tax to put upon the inventors' of the country, and men, too, who were professedly not men of wealth, and who received no present equivalent for what they paid. (Hear, hear.) If a tradesman paid taxes to Government in proportion to the business he had done, not in proportion to the business he intended to do next year, well and good, but it was wrong to tax an inventor for his patent more than a fee sufficient to pay the office expenses. (Hear, hear.) Ten years ago Germany had no Patent Law. There was an Inventors' Congress held at Vienna, attended by representatives from all European countries, when a general outline of law on the subject was discussed and laid down, and Germany had since profited very much by the Congress, and had granted an excellent Patent Law (hear, hear), the results of which were truly marvellous. Last summer he went to Dusseldorff to a meeting of the Iron and Steel Institute, and visited many works in Rhenish Prussia which he had known before, and had not seen for many years, and the spirit of advancement which now manifested there was beyond belief. Everything was made open; there was competition on all hands where there was secrecy and imitation only before. With regard to America he fully corroborated what the Chairman had told them; it was only the Patent Laws of America that worked the wonders to be seen there. (Hear, hear.) He had taken a Patent there which had produced perhaps better results than those in any other country. (Hear, hear.) The facility given there to inventors was truly remarkable. Only a few months ago he received a very characteristic telegram from a gentleman in Philadelphia, "I want to use your invention, but see that you have not patented it. When are you going to patent it that I may use it?" (Laughter.) He, Dr. Siemens, thought that a perfectly true view of the subject. The American was annoyed not to find the Patent for this thing which he wanted to use. The meaning of that was, "You sluggards! what are you about, why don't you patent, as we want to use it." He wanted to have it brought to him already made for use, because he knew well enough that if he tried to use his invention from various reports which he might obtain from newspapers, he would very likely miss his mark and pay much more for it than he would if he went to the Patentee and said, "Now, give me all the information and I will pay you for the use of it." (Hear, hear.) It was the principle that should be instilled into our Legislature, not to look upon Patentees as monopolists, but as most useful and necessary servants to the people and the country. (Applause.)

Mr. Cromwell F. Varley said—In rising to reply to the "Inventors' Cause" I cannot do better than to give my experience both as an inventor and a patentee. In 1854, when I took out my first patents, my first duty was to study the Patent Law, but my occupation as electrician of the Electric and International Telegraph Company, and afterwards as engineer-in-chief of the same company and of the Atlantic Telegraph Company, so engrossed my time that I found it necessary to leave legal matters entirely to my solicitors and patent agents. It is my impression that had the Act of 1852 been carried out as originally intended, had proper Commissioners been appointed as directed by the Act, and had they exercised the powers of that Act, the administration of the Patent Laws would have been more in accord with the requirements of the times. Such Commissioners would have seen the advisability of fostering invention by simplifying the operation of the laws, and of making at least a substantial reduction of the fees and other legal expenses. The experience of other countries, notably Germany and the United States, shows that such a reduction would have increased the number of patented inventions so largely that the exchequer would have derived a much larger revenue from the increased number of cheaper patents than is now reaped from the present prohibitory high rates. Large as is the profit to the State obtained by patent fees, the gain is but a mere trifle compared with the benefit the country would derive were inventors enabled to, and encouraged to, make patent all their numerous mental creations, instead of keeping secret nine-tenths or more of them, waiting or hoping for an opportunity to bring them before the public. The wealth of this country is mainly due to the intelligence and inventive power of its workmen, and everything that checks the development of this intelligence, or tends to prevent inventors from making public their mental creations, deprives the whole community of an enormous amount of wealth and prosperity. The law as at present administered throws numerous and vexatious obstacles in the way of inventors not backed up with large funds. It has become a system for the momentary benefit of the wealthy few as against the hundreds of thousands of nearly impecunious workers who constitute the solid basis, the very foundation of the constitution as of the national wealth and world-wide influence of the country. In a few words, it is class legislation of the very worst type. Let us for a minute compare the large protection afforded to the inventor of a new novel or narrative with that afforded to the inventor of a new process whereby human labour is saved, or cost of production is reduced, or facilities of intercourse increased. As an example, let us compare a Beaconsfield with a Bessemer. The former for a sum of less than £1 will have his creative power secured to himself for forty years, while the latter has had to pay many thousands of pounds for the right to make a profit of his invention for a period of only fourteen years. The public press informs us that Lord Beaconsfield by his new novel will reap over £10,000 for copies already ordered in anticipation. Bessemer, on the other hand, had to spend many thousands of pounds and many years of tedious labour before he could get any real advantage, and then he received in return for his great outlay a right extending for only a few years, and that coupled with the prospect of expensive and tedious litigation. How much will the national wealth be increased by the new novel of the late Premier, as compared with the benefit already reaped by the whole nation from the Bessemer process of economically producing steel in unlimited quantities. The latter, by reducing the wear and tear and the cost of our railways, of our steamers, and of our machinery, benefits every man, woman and child in the United Kingdom and elsewhere. Did our Government fully realise the importance of establishing the very basis of our national existence in the most solid manner, they would rather pay and foster the inventors of new and useful processes than make them pay heavily for what in the majority of cases is a very uncertain advantage. While the writer of a new story obtains an immediate return for his mental creation, the inventor of a new process has to wait, as a rule, many years before he begins to see his outlay come back, and too often the fourteen years granted expire before he has reaped any solid reward. This acts as a damper upon the energy of our nation's true supporters. A wise legislation would encourage invention and industry in every possible way and so promote the welfare of the nation, and assure the peace and stability of the millions. This nation, which has such numerous and important colonies and dependencies, and such a great foreign trade, owes her greatness, her stability, and her moral sway over the world at large more to her manufactures than to anything else. The most suicidal policy any Government can pursue is to put obstacles and discouragement in the way of those who improve those manufactures upon which our very national existence depends. Once let us fall behind our neighbours and our colonies in this respect, and our empire must inevitably fall to pieces. Mr. Anderson's Patent Bill which will shortly be before Parliament, provides a substantial amelioration of many of the evils under which inventors labour, and considering the difficulty of getting useful legislation through Parliament at all, it is my opinion that inventors should give him and his bill their undivided support. That the Irish question which demands the immediate attention of the Government is a burning one, is true, but the time is at hand when much larger interests must be considered before it is too late. The whole of the United Kingdom is suffering from depression of trade of an aggravated form, and farmers here, though not in rebellion against the laws, are as badly off if not worse than their Irish brethren, What is the remedy for this widespread discontent? Not repression of the people, but removal of the cause. Were invention and industry carefully fostered, new openings would be afforded for the labourers of the kingdom, the national prosperity would increase in a startling ratio. All men would be able to pay their way, dissatisfaction would be replaced by contentment, and sedition would receive its quietus. If my remarks make any impression upon those able to influence the legislature, I hope they will impress upon the Government the importance of removing the causes of dissatisfaction by fostering into sources of national wealth those energies now wasted in apathy, or, what is worse, undisguised rebellion. I hope our Government will afford the necessary opportunity and give the required support to enable Mr. Anderson's measure to be passed into law early next sesssion. I suggest that we inventors take counsel together and form such a deputation to the Government as shall demonstrate the national importance of our cause.

Mr. Standfield felt that there were a great many problems to be solved, and the proper man to solve them was the inventor. One problem was how to save the great loss of life that occurred every year in our mines, wherein upwards of 6000 lives were lost every year, and probably twice that number maimed. On our merchant marine many thousand lives were lost, and also on railways; and statistics would prove that during the last sixty years inventors had so far improved our breaks, mining, and winding appliances, &c., that where thousands of tons of coal were raised only half the number of lives were now lost that were lost sixty years ago. (Hear, hear). That saving of life could be put down to the inventors' genius of this country. (Hear, hear.) It must be borne in mind that before our millions could be fed our products must be sold in foreign markets, the necessary means of purchasing which we must provide. Another problem solved was how to find employment for the ladies of this country. Our inventors had already done this for millions of them in the cotton-spinning districts of Lancashire, and no doubt if the great obstructions of stamp duties were removed we should find employment for all our surplus population, male and female, and also for our youth light and lucrative employment if the present restrictions on inventors were removed. (Hear, hear.) He felt that out of the 15,000 lives lost every year that half the number were thrown away because our inventors were not allowed to go freely to the rescue. (Hear, hear.) It was different in the United States. There they taxed only £7 against £175 in this country, and it was 25 to 1. It was clear if we were to hold our own as merchants and be successful in trade we must allow inventors to assist in every possible manner to supply labour-saving tools, and so that we might be better able to hold our own with rival competitors, (Hear, hear.)

Mr. Chesterman, the Master Cutler of Sheffield, in appropriate terms proposed, as the next toast, "The Inventors' Institute," which had doubtless done much in times past to keep the important national question of Patent Law before the public, and would be doing good service by stepping forward at the present time and working for a really good and cheap Patent Law, and he thought he might say that it would not be so very long before this desideratum would be effected; such an expectation might well be hopeful whilst the Institute possessed the president and officers it did. He would ask the much esteemed secretary, Mr. F. W. Campin, and Mr. F. H. Varley to reply to this toast.

Mr. Campin being unable to use his voice from the effects of an attack of bronchitis, had his speech read for him. It was as follows:—Never in my life have I been placed in a more difficult position than at the present moment, seeing I am kindly favoured by the public manifestation of your estimation of myself and my efforts on behalf of the Inventors' Institute, and at the same time am by ill-health debarred from replying to such public manifestation with that feeling and freedom which the capability of the use of healthy organs of speech would have afforded me. Just now this is to me a special source of regret, for not only would I have tendered to you *viva voce* my hearty thanks for your kind recognition of my services as secretary to the Inventors' Institute and advocate of Patent Reform of many years standing, but I would have made the present occasion the means of putting forward some statements in regard to the working of our patent system at this time,—desiring as I do to present you with this, because I think I can show that quite independently of those cardinal points of a good patent system, namely, cheapness and efficiency, as to which nearly every speaker will tell you something to the purpose, I wish to urge upon you that we also require what we ought now to have under the present Patent Law, namely, a reasonable and efficient management of the Government Patent Office, and of the proceedings which a patentee is legally compellable to fulfil in order to secure a patent. (Cheers.) Certainly no one would expect anything less than this from a system presided over by such high and honourable men as our Lord Chancellors, Masters of the Rolls, and her Majesty's law officers for the three Kingdoms. In truth and in fact, however, these high officers have troubled themselves but little in the matter, they having for a number of years entrusted the management of the office to the hero of what some people have been pleased to call the Edmunds scandal. Mr. Leonard Edmunds, the late Clerk of the Patents, whose policy was, taking in as many fees as possible, and spending as little thereout as might be, a system that would soon have come to grief if the post of Superintendent of Specifications concurcurently with Mr. Edmunds' appointment, had not been assigned to Professor Bennett Woodcroft, who did, as far as such a beggarly system would allow, bring the Library and Publication Department into something like an efficient state. However, at last the Edmunds scandal came to a settlement, and scarcely had this been brought about and Mr. Woodcroft placed in the ascendant, than that gentleman found himself getting old and unable to fulfil the duties of his office, which he accordingly resigned. Hereupon a gentleman fresh from that ultra-circumlocution office, the Board of Trade, who, having been doing dilettante work for several years in connection with a well-known society, was appointed Clerk of the Patents, also Registrar of Designs, and, still more, charged with the onerous duties of Registrar of Trade Marks, which involved the working of an entirely new Act requiring great care and circumspection in its administration. As to the results of this course of action on the part of the Commissioners, the Patent Law Publications are frightfully in arrear. The most important of these, the abridgments of specifications, some of the important classes being brought up no nearer to the present year than 1865—a few classes having been brought up to 1875 or 1876—which is practically the work of four years by an official staff that one would have expected would have brought up nearly all the classes to something like the present date. And as to rules and regulations of the office, none have ever been made but such as curtail the inventors' rights, some of them being violations of the Act, and some, it would seem, never having been submitted to the Commissioners at all. All this, my friends, shows that Patent Law Reform is needed even for the reasonable and efficient working of the present Patent Law quite as much as to carry on a new and improved Patent Law

Mr. F. H. Varley, in rising to respond to this toast, said that having been an active worker in the Executive of the Inventors' Institute, he felt that it would be impossible to say too much on its behalf, for it had for years past been the acknowledged advocate of the inventors' cause, which was no mean or selfish one, for it embraced a really national question; nay, more than that, a question of civilisation and progress, and he trusted that our legislators would soon come to understand that the cause of the inventor was one superior to all others. (Cheers.) But beyond all things the Inventors' Institute made a point of taking a practical course. Hence it now proposed to give its support to the Bill brought forward by Mr. Anderson, Mr. Broadhurst, and other M.P.'s, rather than elaborate a measure of its own, which, although it might be the acme of perfection, might fail to please all parties. His motto was—Let us do something practical without delay. (Cheers.)

Mr. J. J. Aston, Q.C., proposed the "Dinner Committee," who had brought them together and presented them with such good fare, and having done this he would beg to be allowed to say a few words on the main question in which all present were so much interested. As a lawyer having much to do with patent questions, and himself an inventor, he could say without reserve that the present Patent Law needed not merely cheapening, but thorough revision.

Messrs. Morgan and Hellier, the honorary secretaries' names, were coupled with this toast, and they duly acknowledged the same.

The Vice-Presidents and Council of the Institute were drank and duly replied to, and the proceedings terminated with the usual ovation to Sir Antonio Brady, the President and chairman of the evening.

Proceedings of Societies.

NUMISMATIC SOCIETY.

Oct. 21.—J. Evans, Esq., D.C.L., President, in the chair.—Mr. Hoblyn exhibited patterns for a penny and halfpenny of George III., 1788, by Pingo, the former being the first copper coin struck of that denomination; also a penny of Jamaica, struck in copper instead of white metal, and patterns of one-cent and half-cent pieces of Nova Scotia, 1861, differing materially from the current coin.—Mr. Pearson exhibited a curious and unpublished leaden medallet of Queen Elizabeth, with the inscription NIL NISI CONSILIO, 1588.—Mr. Gill exhibited a styca of Wulfred, Archbishop of York, of base silver, and a copper coin of Cunobeline found at Chester Camp, near Wellingborough, of the type of Evans, Pl. xii. 6.—Mr. P. Gardner read a paper on some new and unpublished Bactrian coins.—Captain E. Hoare communicated a paper on some early and modern tokens bearing the name of Hoare.

ENTOMOLOGICAL SOCIETY.

Oct. 6.—H. T. Stainton, Esq., V.P., in the chair.—Sir A. Scott and Mr. F. E. Robinson were elected ordinary members. — Mr. McLachlan stated that last year he had exhibited specimens of *Anthocoris nemorum*, an Hemipterous insect supposed to be damaging the hops growing near Canterbury, but had then expressed his opinion that the insect was not the true culprit, its habits being probably carnivorous. This year he had received from the same correspondent some small larvæ which had been found in the cones, and these he considered were not only the true enemy of the hops, but were also the food of the Anthocoris.—Sir S. Saunders exhibited a series of apterous females of the new species of Scteroderma adverted to at the previous meeting, and read remarks thereon.—Messrs. Kirby, Fitch, Ralfe, and the Rev. E. N. Gilbert exhibited several varieties of Lepidoptera taken in this country and on the Continent, some of which, from the structure of the antennæ, were considered "hermaphrodite" forms.—Mr. H. Ramsden communicated a note on *Pyrophorus causticus*, a Cuban fire-fly.—Mr. Swinton read two papers entitled "Some Experiments on the Variability of Lepidoptera undertaken during the Year 1880," and exhibited specimens and figures in illustration.—Mr. Butler communicated a paper entitled "Observations on the Lepidopterous Genus Terias, with descriptions of hitherto unnamed Forms from Japan."—Mr. Waterhouse communicated a paper "On the Buprestidæ from Madagascar." — Messrs. Kirby, Distant, and McLachlan called the attention of the society to a method of publishing descriptions of new species pursued by M. André in recent parts of his work on European Hymenoptera. These were not only inserted on the cover of his quarterly parts, but even at the end of sheets of advertisements laid loosely between the pages of a part. It was regretted that no other course than that of protest and disapprobation could be applied in the interest of science to such a practice.

QUEKETT MICROSCOPICAL SOCIETY.

Oct. 22.—T. C. White, Esq., President, in the chair.—Two new members were elected.—Mr. F. Crisp exhibited an improved form of bottle slide, which could be adjusted to any desired thickness, and might be taken to pieces when required for cleaning.—Dr. M. C. Cooke read a paper "On New Freshwater Algæ found during the Year," in the course of which he described nine species which were new to Great Britain, of which three were new to the British Isles. Another species also found was as yet unnamed. The new species were found by Mr. Wills at Capel Curig, and belonged to the genus Staurastrum.

ROYAL INSTITUTION.

Nov. 1.—G. Busk, Esq., Treas. and V.P., in the chair.—Mr. L. E. Ames was elected a Member.

ARISTOTELIAN SOCIETY.

Oct. 25.—F. G. Fleay, Esq., V.P., in the chair.—Mr. Frederic Harrison and Mr. R. A. Chubb were elected Members.—A paper by Mr. J. A. Cooper was read, "On the Scholastic Philosophers."—A paper, "On the Arabian Philosophers," was then read by Mr. Harold Senier. The author traced the general course of Oriental philosophy from the eighth to the thirteenth century, treat-at length the theories of Algazzali, Averroes, &c. Finally, he traced the effect of the Arabian philosophy upon succeeding schools.

GEOGRAPHICAL SOCIETY.

Nov. 8—Lord Aberdare, President in the chair.—The following gentlemen were elected Fellows: Sir C. F. Shand, Major-General W. A. Fyers, Col. R. Harrison, Messrs. R. Bayly, W. Callow, H. Collier, C. Cooper, G. H. Drew, C. R. Fenwick, W. Fowell, and S. S. Thorburn.—The paper read was "Journey to the Lukuga Outlet of Lake Tanganyika, *viâ* the North End of Lake Nyassa," by Mr. J. Thomson.

GEOLOGICAL SOCIETY.

Nov. 3.—R. Etheridge, Esq., President in the chair.—Mr. B. B. Woodward was elected a Fellow.—The following communications were read: "On the Serpentine and the Associated Rocks of Anglesey, with a Note on the so-called Serpentine of Porthdinlleyn (Caernarvonshire)," by Prof. T. G. Bonney.—"Note on the Occurrence of Remains of Recent Plants in Brown Iron Ore," by Mr. J. A. Phillips,—and "Notes on the Locality of some Fossils found in the Carboniferous Rocks at T'ang Shan, situated in a N.N.E. direction, about 120 miles from Tientsin, in the Province of Chih Li, China," by Mr. J. W. Carrall, with a Note by Mr. W. Carruthers.

ARCHÆOLOGICAL INSTITUTE.

Nov. 4.—Sir John Maclean in the chair.—On this, the opening meeting of a new session, the Chairman congratulated the members upon the success of the second meeting of the Institute at Lincoln, and on the exhibition of helmets and mail held at the rooms of the Institute in June.—Mr. C. D. E. Fortuum read a paper "On Finger-Rings and on some Engraved Gems of the Early Christian Period," which was in fact a continuation of former paper by the author on the same subject, which have been printed in the *Archæological Journal*. The paper treated respectively of Christian finger-rings, rings Christian or otherwise. and engraved gems of various kinds.—Prof. Westwood read a paper "On an Earthenware Posset-pot inscribed 'Job Heath, 1702,'" and gave an interesting account of the potters of the Heath family in Staffordshire, mention being also made of earthenware gravestones which may be seen in the district of Burslem.—Mr. Fortnum then read a second paper, entitled "Notes on other Signacula of St. James of Compostella," this subject being treated by the author for the second time. It would appear that jet—the *azavache* of the Spaniards—is indigenous to Spain as well as to France and England; and Mr. Fortnum's fine examples of figures of St. James carved in this intractable material, and emanating from Compostella about the middle of the sixteenth century, show that the material was both plentiful and held in high estimation. The closing of monastic institutions in Italy appears to have brought to light many hitherto hidden objects of rarity and value. Mr. Sparvel-Bayley read a paper "On Hadleigh Castle in Essex," giving a careful historical and architectural account of this little-known fortress. Its whole history, it was shown, may, however, be found inscribed upon the public records, and it seems probable that Hadleigh Castle owed its erection to the master mind of William of Wykeham. But Wykeham's building took the place of an old structure, built by Hubert de Burgh in the early part of the thirteenth century. It finally passed from the Crown in the time of Edward VI.—The Chairman exhibited some fine enamels and bronzes from the Summer Palace, and personal ornaments from the South Sea Islands.—The Rev. A. Orlebar sent a fine tilting-helm with the wooden crest of Sir John Gostwick, Master of the Horse to Henry VIII., as well as a close helmet of the time of Charles I., of a later member of that now extinct family, from their tombs in Willington Church, Beds.—Mr. Thompson Watkin sent a photograph and notes on a remarkable inscribed stone of the time of Septimus Severus, found at Brough, Westmoreland, the Veteræ of the Romans.

CHEMICAL SOCIETY.

Nov. 4.—Prof. H. E. Roscoe in the chair.—The following papers were read: "On the Compounds of Vanadium and Sulphur," by Mr. E. W. E. Kay,—"On the Atmospheric Oxidation of Phosphorus, and some Reactions of Ozone and Peroxide of Hydrogen," by Mr. C. T. Kingzett: the author concludes that in the above oxidation both ozone and peroxide of hydrogen are formed; the former passes on in the current of air, the latter remains in the water in which the phosphorus is oxidized: in several experiments the proportion of peroxide of hydrogen to the ozone formed was as 1 to 2,—"On the Action of Zinc Ethyl on Benzoylic Cyanide." by Messrs. E. Frankland and D. A. Louis,—"On Bismuth and Bismuth Compounds," by Messrs. M. M. P. Muir, G. B. Hoffmeister, and C. E. Robbs,—"On the Colour Properties and Relations of the Metals Copper, Nickel, Cobalt, Iron, Manganese, and Chromium," by Mr. T. Bayley,—"Action of Diazonaphthalin on Salicylic Acid," by Mr. P. Frankland,—"On the Bari-Sulphates of Iron," by Mr. S. Pickering,—"Fourth Report on Researches in Chemical Dynamics," by Messrs. C. R. A. Wright and A. E. Menke,—"On some Naphthalin Derivatives," by Messrs C. E. Armstrong and N. E. Graham,—and "On Acetylorthoamidobenzoic Acid," by Messrs. P. P. Bedson and A. J. King.

PHILOLOGICAL SOCIETY.

Nov. 5.—Mr. A. K. Ellis, President in the chair.—Mr. H. Sweet opened the adjourned discussion on spelling reform. He reviewed the temporary decisions arrived at by the meetings last July, read from his printed "Further Notes on English Spelling," that had been sent to all members, passages from Caxton and Shakspeare in his altered spelling, but in the pronunciation of their respective times, and moved his printed resolutions on "Immediate Reforms of English Spelling." After much discussion, the first three of these were carried in the following form: 1. That an immediate partial phonetic reform of English spelling is most desirable and practicable. 2. That one of the chief objects of such a reform is to facilitate the acquisition of English spelling. 3. That the Society does not pledge itself not to go beyond the principle ef etymological limitation in certain cases.—The discussion will be resumed on November 19th.

INSTITUTION OF CIVIL ENGINEERS.

Nov. 9.—Mr. W. H. Barlow, President, in the chair.—The paper read was "On Machinery for Steel-making by the Bessemer and the Siemens Processes," by Mr. B. Walker. —The Council reported that they had since the last announcement transferred six gentlemen from the class of Associated Members to the class of Members, and had admitted thirty-eight Students.

SOCIETY OF BIBLICAL ARCHÆOLOGY.

Nov. 2.—At the opening meeting of the session 1880-81, the Secretary, in the absence of the author, Rev. A. H. Sayce, read the following communication: "On the Bilingual Hittite and Cuneiform Inscription of Tarkondemos." Dr. Mordtmann appears to have been the first (1862) to describe the boss bearing the inscription of Tarkondemos. At that time it was in the possession of M. Alexander Jovanoff, of Constantinople, who had obtained it at Smyrna. Made of very thin silver, 16½ "English lines" in diameter, circular in form, like half an orange, he thought it must have served as the knob of a staff or dagger. The outer surface was divided into two fields, the inner and larger of which had the figure of a clothed warrior standing erect in the centre, holding a spear in the left hand, and surrounded by a series of "symbols." Mr. Sayce, having come across the description, and recognised the Hittite character of the object with some difficulty found the periodical in which the copy of it appeared, but his doubts as to its genuineness were not satisfied until he had compared Mordtmann's plate with the various casts extant. This comparison at once satisfied him that the copy we possess is as good as the original itself. The cuneiform legend he read as follows, "Tarrik Timme, King of the country of Erme."—Mr. T. Tyler, M.A., read a paper "On the Inscription of Tarkutimme, and the monuments from Jerablus, in the British Museum."—Remarks were added by Rev. W. Wright. R. Cull, Rev. C. J. Ball, Dr. Birch, and the Secretary reminded the meeting that those who had seen the original silver boss had pronounced it a forgery: under any circumstances it could hardly be thonght to be of the age stated. He also mentioned that the Society had a quantity of "Hittite" type in progress of manufacture, and hoped at an early date to publish correct plates of both the inscriptions from Hamath and Jerablus.

ENGLISH SPELLING REFORM ASSOCIATION.

Nov. 9.—Mr. A. J. Ellis in the chair.—Mr. E. Jones read a paper on the necessary conditions in a better system of spelling intended for use in public elementary schools. These conditions were that each recognized sound should have a distinctive symbol; that the new spelling should be one that could be easily and readily printed; that it should be adaptable to both writing and printing; and that children taught by it should be enabled to pass readily to the ordinary spelling. The language at present was to a large extent spelled phonetically, and the exceptions could be levelled with comparatively small change. If, therefore, reformers confined themselves to adapting the existing material which was sufficient for the purpose, a better system could be devised without difficulty.

ASTRONOMICAL SOCIETY.

Nov. 12.—Prof. Cayley, V.P., in the chair. Messrs. H. A. Severn, B. F. Cobb, and the Rev. F. B. Allison, were elected Fellows. —The Astronomer-Royal described an instrument of Flamsteed's, of which he possessed an engraving that appeared to be unique. He stated that he believed this instrument marked an epoch in the history of astronomy. Before the invention of clocks which could be relied upon for the determination of time over periods of a day or longer, right ascensions had to be measured by the triangulation of stars; there was never any difficulty in determining the polar distances of stars with a graduated arc in the meridian. Having determined the polar distances of two stars, the distance between them was measured with a moveable arc, and the difference of right ascension found by calculation. Tycho possessed an instrument for measuring such distances; but it was only provided with sights, and it was mounted on a vertical axis. This instrument of Flamsteed's was mounted on a polar axis, which projected beyond its bearings. On the top of the axis was a movable T head, carrying the graduated arc with two telescopes. The moveable T head could be inclined by a rack and screw motion, so as to enable the observer to measure the distance between two stars which differed in declination. The instrument was only used for determining the places of the principal stars, and a clock which would go pretty well for some hours was used for determining the differences of right ascensions of smaller starsas measured from the larger ones. Flamsteed was succeeded by Halley, who relied entirely upon the places of principal stars as determined by Flamsteed, and filled up the interspaces by means of observations made with a curious transit instrument, with axes of unequal length. The great reform in the method of determining the positions of stars was brought about by Graham, the clockmaker, who invented the dead-beat escapement and the gridiron pendulum, which enabled right ascensions to be determined all round the heavens by observing the times of transit with a meridian instrument.—Mr. Knott read a paper entitled "Observations of Ceraski's new Variable Star in Cephus," The star is of the Algol type, and comes to its minimum every two and a half days; it remains constant in brightness for the greater part of the period, and then suddenly decreases in brightness, remaining for a short time at its minimum brightness, and then rapidly increases again.—Mr. Common read a paper on the method of mounting his great 3-ft. reflecting telescope.—Mr. E. J. Stone read a paper "On a Determination of the Coefficient of the Parallactic Inequality in the Expression for the Moon's Longitude"; and Capt. Noble read a note "On a Phenomenon of Jupiter's Satellites," He mentioned that on recently observing the planet when the shadows of two satellites were projected upon the disc, he had noticed that one of the shadows was of a chocolate brown colour, while the other appeared perfectly black.—Mr. Campbell corroborated Capt. Noble's observation with respect to the difference in tint of the two shadows.

ASIATIC SOCIETY.

Nov. 15.—Sir H. C. Rawlinson President, in the chair.—Sir W. R. Robinson, Mr. S. S. Thorburn, Capt. R. G. Gill, R.E., and the Rev. M. Argles, were elected Resident Members; and the Bishop of Lahore, Lieut. H. E. McCallum, Dr. S. W. Bushell, and Abd-er-rahman Moulvie Syed, Non-Resident Members.—Prof. Monier Williams read a paper "On Indian Theistic Reformers."

LINNEAN SOCIETY.

Nov. 4.—Prof. Allman, F.R.S., President, in the chair.—Messrs. Edw. Brown, H. E. Dresser, and F. Pippe were elected Fellows of the Society.—Mr. H. C. Sorby showed drawing of some British Sea anemones, with habitat on the upper fronds of long seaweeds in deep water; and he recorded having seen a solitary cream-coloured Cetacean on the English coast. Mr. Arthur Bennett drew attention to a new British Chara (*C. stelligera*), remarkable for the presence of stellate bulbils on the stems.—Mr. E. M. Holmes exhibited two marine Algæ new to Britain, viz., *Kasya Gibbesii* from Berwick-on-Tweed and *Ectocarpus terminalis* from Weymouth; and also species of Callithaminon with antheridia and trichophore on the same branchlet.—Prof, T. S. Cobbold exhibited a remarkable Trematode from the horse, discovered by Dr. Sonsini at Zagazig during the Egyptian plague, with which outbreak, however, the parasite had no necessary connexion. The worm (*Gastrodicus Sonsinonis*) appears to be an aberrant Amphistome furnished with a singular central disc, whose concavity was lined with about two hundred small suckers, altogether having a tesselated aspect. In this respect its nearest approach was a worm infesting a genus of spiny-finned fishes (Cataphractus) belonging to the Triglidæ. According to Prof. Leuchart's recent anatomical investigation doubts, however, are thrown on its amphistomoid affinities.—Mr. G. F. Angas showed the leaf of *Hermas gigantea*, an umbelliferous plant of the Cape, used as tinder by the Hottentots.—Mr. E. A. Webb exhibited a monstrous bramble (*Bubus fruticosus*) with flowers represented by elongated axes covered with minute pubescent bracts and apices faciated.—A paper by Dr. Geo. Watt, "Contribution to the Flora of North-West India," was read. He divides the district into three areas. The first range, Ravee-Basin, with forests of *Cedrus deodara* on its northern slopes, has on the southern ones vegetation with an Indian facies, being barely outside the humid influence of the tropical rains of the plains. The second range, comprising Pangi, Lower Lahore, and British Lahore, has a flora altogether changed, dry short summers and snow-clad mountains giving a climate and plant life of quite a different cast. In the third range the flora assumes a Thibetan type. Some three hundred species of plants are noted, four being new.—A paper "On the Papilionidæ of South Australia," by J. G. Otto Tepper, was read. The butterflies of this part of Australia are comparatively few, and sombre colours prevail.—"Notes on a Collection of Flowering Plants from Madagascar" was read by Mr. J. G. Baker. The flowering plants are less known than the ferns from this interesting Island; two new genera are now denoted, viz., 1. Kitchingia, belonging to the Crassulaceæ, a succulent herb with fleshy sessile leaves and large bright red flowers in lax terminal cymes; Rodocodon, a liliaceous plant with red flowers and peculiar spurred bracts; it comes between Muscaria and Urginea. Thirty new species are described.

MATHEMATICAL SOCIETY.

Nov. 11.—C. W. Merrifield, Esq., President, in the chair. After the Treasurer's and Secretaries' Reports had been read and adopted, the meeting proceeded to the election of the new Council. Mr. G. Roberts, the new President, having taken the chair, Mr. Merrifield read his valedictory address, "Considerations respecting the Translation of Series Observations into Continuous Formulæ." On the motion of Prof. Cayley the address was ordered to be published in the *Proceedings*.—Mr. H. M. Jeffery read a paper "On Bicircular Quartics, with a Triple and Double Focus and Three Single Foci, all of them Collinear."—Mr. Tucker read parts of a paper by the Rev. C. Taylor, entitled, "Further Remarks on the Geometrical Method of Reversion."

INSTITUTION OF SURVEYORS.

Nov. 8.—The President, Mr. E. Ryde, opened the session with an address.—Mr. R. Keirle was elected a Member.